Vol. 7, No. 7 JULY, 1952

AGRICULTURAL CHEMICALS

In This Issue:

Distribution of Pesticides in U. S. • National Fertilizer Assn. Meets • New Chemical for Iron Chlorosis Control
American Plant Food Council Meets • Testing Mercury Residues • Outlook Healthy for Fertilizer Industry
American Farmer Deserves Support (Rep. Cooley) • Fertilizer Safety Advisory Group Meets • A. L. Mehring Retires

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AGRICULTURAL CHEMICALS

THIS MONTH'S COVER

Three participants in the recent meeting of the American Plant Food Council at the Homestead Hotel. Left to right: Dr. Paul D. Sanders, moderator of forum; Hon. Harold D. Cooley, chairman of House Committee on Agriculture, forum speaker; and Paul T. Truitt, president of the Council. —Photo by Louis Wilson, American Plant Food Council.

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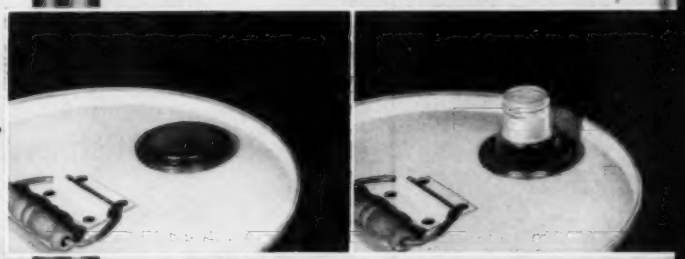

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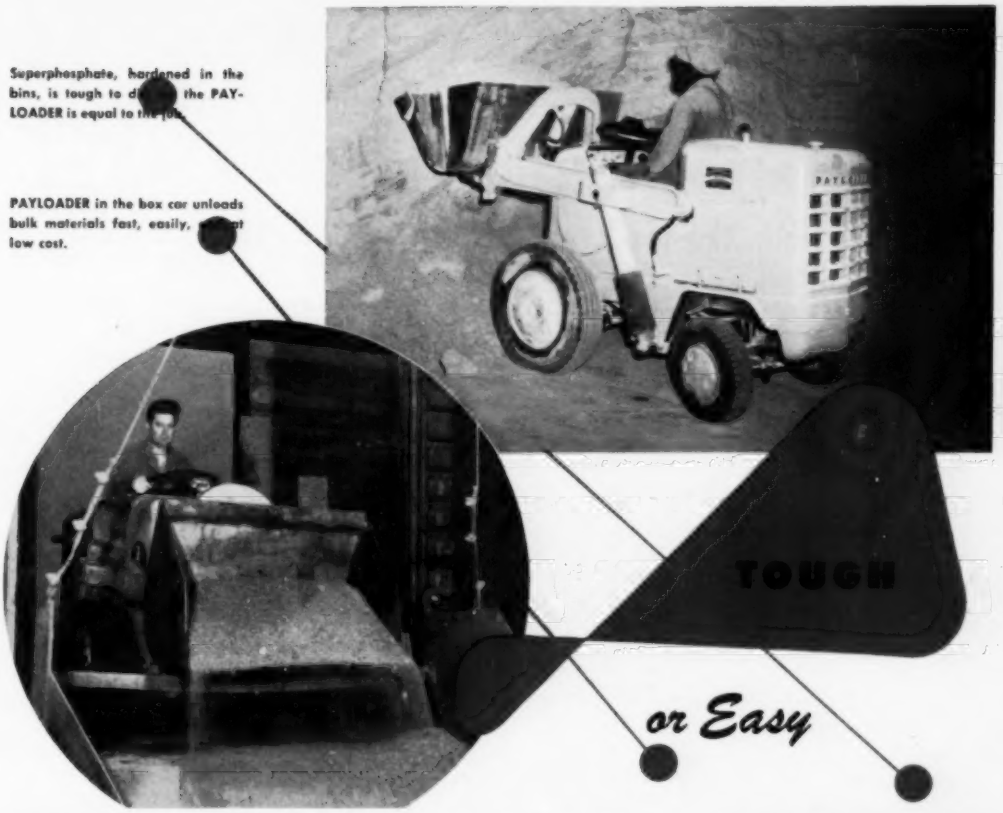
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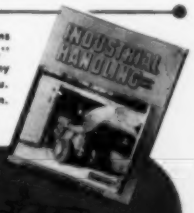

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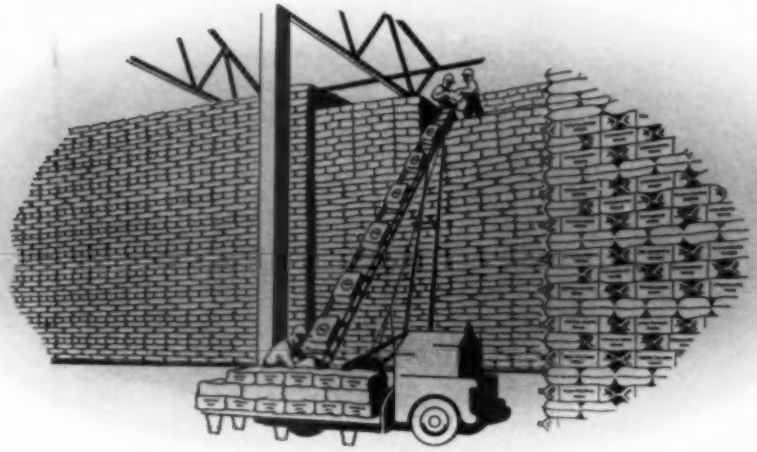

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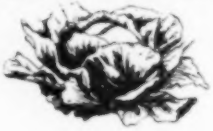
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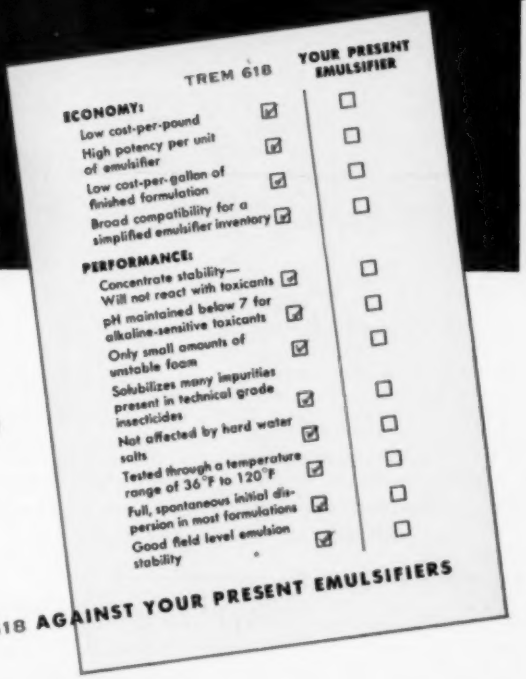
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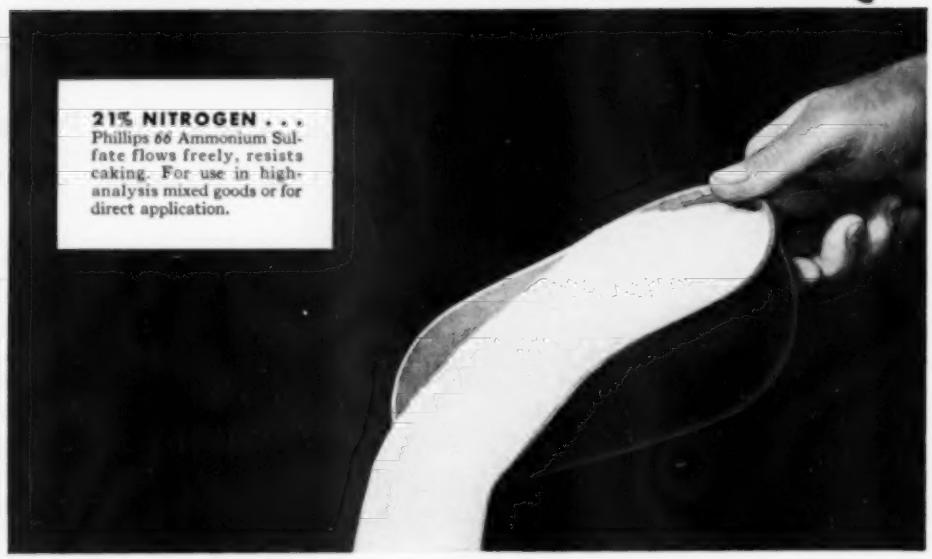
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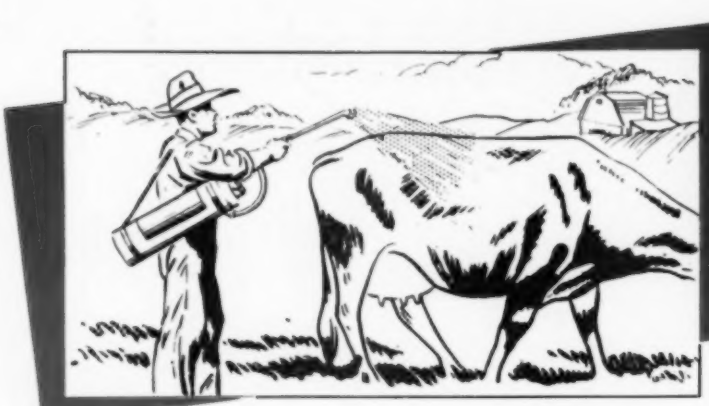

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	Soft	3B	6B
10% "Y"	Hard	st	1B
	Soft	2B	5B
3% Remsen 202	Hard	st	1B
	Soft	st	st
6-lb. Toxaphene, dilution 5%			
5% "X"	Hard	6B	6B
	Soft	4B	5B
3% "Y"	Hard	3B	4B
	Soft	5B	6B
3% Remsen 202	Hard	st	st
	Soft	1B	2B
25% DDT, dilution 5%			
2% "X"	Hard	1.5B	2.5B
	Soft	2B	3.5B
4% "Y"	Hard	3.5B	5B
	Soft	4B	5B
2% Remsen 202	Hard	st	st
	Soft	st	st
3.34-lb. Isopropyl Ester 2, 4-D, dilution 5%			
3% "X"	Hard	4B	4.5B
	Soft	1.5B	2B
5% "Y"	Hard	3B	5B
	Soft	3B	4B
5% Remsen 202	Hard	st	1B
	Soft	st	st

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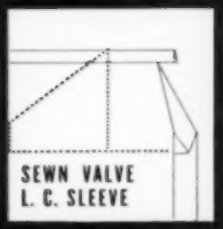
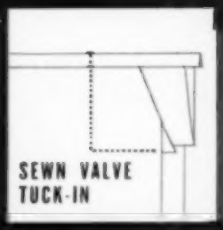
MULTIWALL





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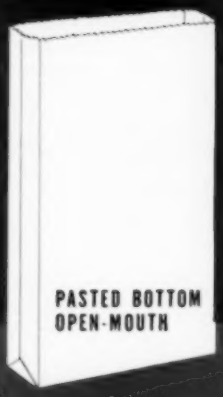

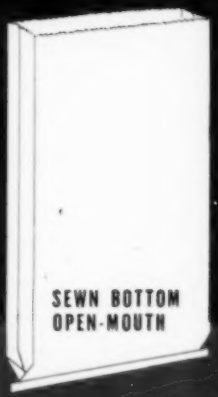

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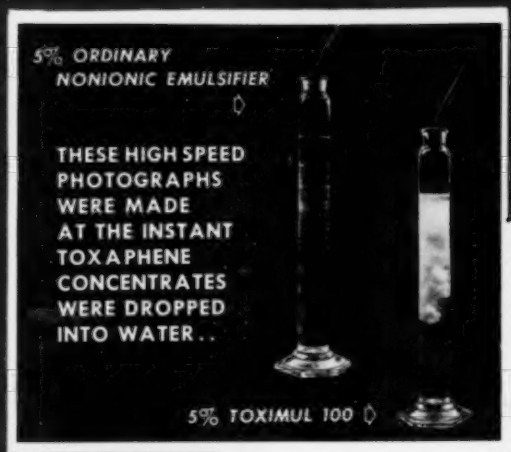
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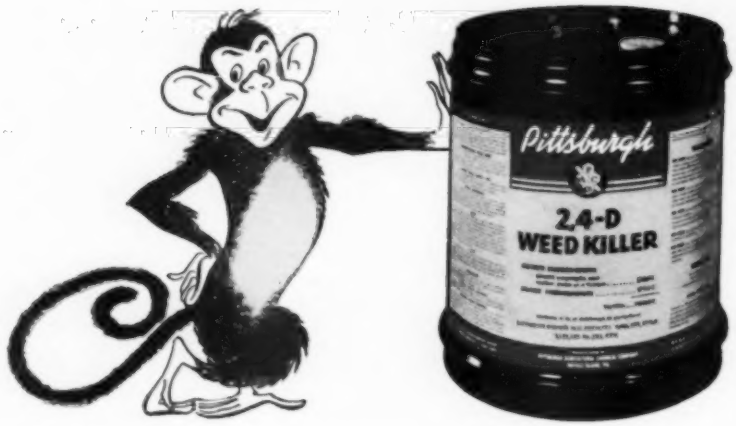

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THE EDITOR COMMENTS

THE third of a four-part report having been turned in to Congress by the Delaney Committee, the pesticide trade was waiting expectantly at press time to see what might develop in the way of recommendations for new federal legislation covering the manufacture, marketing and use of various chemicals in protecting crops from insects, plant disease and other depredations.

In the case of fertilizers, the industry was given a clean bill of health, but the cosmetic report indicated that existing federal law is inadequate to protect the public, and recommended that the Federal Food, Drug and Cosmetic Act be amended to require that evidence of the safety of new cosmetic preparations be submitted to the FDA before they are marketed.

A similar recommendation for amendment of the Food, Drug and Cosmetic Act has now been made by the Committee "to require that evidence of the safety of chemical additives to foods be submitted to the Food and Drug Administration before they are actually used." The Committee indicated that it was persuaded to make this recommendation because it feared that "chemicals have been introduced into the food supply of the Nation without adequate testing of their possible long-range injurious effect; and the public is not afforded sufficient protection by existing legislation."

The $64 question now is, of course, what specific legislation will the Committee recommend? It is earnestly to be hoped that the new rules it offers will not prove unduly cumbersome and unworkable, and that, if adopted, their enforcement will not seriously impede essential crop production.

THAT a tremendous business potential lies ahead for the fertilizer trade was reiterated many times at the two big conventions held recently. With all indications pointing to a greatly increased population and with very few additional areas to utilize for food and fiber production, the demand for fertilizer to increase yields on presently-used lands is sure to increase each year. According to facts brought out at the conventions, the U. S. will be about 70 million acres short in 1975, and this deficit will have to be made up with stepped-up production through the use of both fertilizers and pesticides.

Just how great is this potential? Russell Coleman, NFA president, pointed out that today 95 percent of the country's grassland and 75 percent of our crop land are currently receiving no fertilizer. This offers both an opportunity and a challenge for a greater sales effort to extend the benefits of better fertilization to these untouched areas.

Production schedules call for an additional 900,000 tons of nitrogen by 1955 . . . which is not very far away. Production of this amount seems assured, since certificates of necessity have made possible the construction of numerous new plants which are expected to be in operation at an early date.

Along with the general optimism, however, some persons in the industry are maintaining a little more reserved attitude toward the huge nitrogen program. They fear a possible oversupply either of nitrogen or of corn, come 1955. It might be well for the industry to keep at least one foot on the ground in this all-out production effort and not to become so enamoured with the program, worthy as it is, that practical matters of sales and storage may be overlooked.

FERTILIZER manufacturers are being urged to send representatives to the coming industry-wide meeting of the Fertilizer Safety Section of the National Safety Council in Chicago, October 22 & 23. A recent meeting of the advisory committee brought out plans for a thoroughly interesting and informative gathering. We hope that this year's crowd, like that of 1951, will exceed expectations.

Regional Distribution of

PESTICIDES

Used in Crop Years

1949-50 and 1950-51

by

H. H. Shepard

Office of Materials and Facilities
Production and Marketing Administration
U. S. Department of Agriculture
Washington 25, D. C.

TO assure the availability of adequate supplies of pesticides for agricultural use each year, knowledge is required of the quantities needed in each area or region. The manufacture and distribution of sufficient pesticides cannot be accomplished in a few weeks before and during the growing season, although most of the materials are used during that short period. This has become an all-year operation which is dependent upon careful planning by the producers, the processors, and the distributors to provide supplies of suitable pesticides when and where needed.

The need for pesticides is determined almost entirely by the variable occurrence of those pests which must be controlled to allow the most economical production of crops. To estimate accurately in advance of the growing season, the total quantities of pesticides to be required in the United States, is difficult. In many cases, such estimates would be unrealistic without reliable information on over-all quantities of each pesticide produced and consumed in previous years.

To estimate the quantities of pesticides used in geographical regions is even more difficult than to estimate the total quantities, as little or no data are available on the proportion of the total used in each region in previous years.

Studies were made in 1951 and 1952 to provide a basis for determining national requirements for major pesticides. In connection with these studies made under the sponsorship of the PMA state committees and Insular area offices by special technical advisory committees, of specialists and other competent persons in each state or insular area, the quantities of each of the major pesticides estimated to have been used during the crop years of 1949-50 and 1950-51 were reported. These reports provided a basis for determining the proportion of the total quantity of each pesticide estimated to have been

used in each state or insular area.

A tabulation of the quantities of certain pesticides estimated to have been used by domestic agriculture during the crop year 1949-50 and 1950-51, and the estimated requirements for these materials during 1951-52, has been given by Shepard (1952). The crop year is the period beginning October 1 of one calendar year and ending September 30 of the following year. "Pesticides" are chiefly the chemicals or chemical mixtures which are used as insecticides, fungicides, and herbicides. Certain other chemicals used as defoliants for cotton and other crops are also included.

Based on the state pesticide studies for the two years, the average percentage of the combined total quantities of each of 11 major pesticides estimated to have been used in the United States during the two seasons, 1949-50 and 1950-51, was calculated for each state and territory as shown in table 1. The crop year 1949-50 was characterized generally by the occurrence of several pests in more serious degree than in recent years. Consequently, available supplies of pesticides were used about as fast as distributed. Destruction by

TABLE 1.- State Distribution of Certain Pesticides Expressed in Percentage of the Quantity Estimated to Have Been Used in the Two Crop Years 1949-50 and 1950-51

STATE OR TERRITORY	BENZENE HEXACHLORIDE	CALCIUM ARSENATE[1]	COPPER COMPOUNDS	2,4-D AND 2,4,5-T	DDT	DITHIOCARBAMATES	GRAIN FUMIGANTS (LIQUID)	LEAD ARSENATE[1]	PARATHION	ROTENONE	CONDITIONED SULFUR
New England and Middle Atlantic States:											
Connecticut	0.2	-[2]	0.6	0.4	0.7	2.9	-	2.6	0.4	2.4	0.3
Delaware	-	.4	.4	.1	.2	.3	-	-	.2	1.1	.1
Maine	.1	2.7	8.0	.2	1.4	3.3	-	2.7	1.1	2.2	1.0
Maryland	.2	1.2	4.4	-	1.0	.7	.9	1.5	2.3	3.7	.3
Massachusetts	-	-	.7	.1	1.3	2.3	-	3.1	.1	7.0	.5
New Hampshire	-	-	.1	-	.1	-	-	1.2	.1	.2	.1
New Jersey	.2	1.5	2.1	.1	1.4	7.8	-	3.0	3.2	3.9	1.6
New York	.3	-	17.5	.5	3.2	9.0	.3	9.1	3.5	16.6	4.8
Pennsylvania	.6	.5	9.5	.9	2.1	4.2	2.8	9.2	1.1	3.8	1.3
Rhode Island	-	-	.3	-	.2	.4	-	.1	-	.6	-
Vermont	-	-	.1	-	-	.9	-	.9	-	-	.1
Virginia	-	.1	.9	.2	.2	1.1	.2	2.3	.5	8.2	1.4
West Virginia	.1	.1	2.1	.2	1.2	1.7	.7	3.1	1.9	.7	1.0
Southern States:											
Alabama	4.7	3.3	.4	.1	2.8	1.1	.4	.6	-	2.8	4.7
Arkansas	8.8	27.4	.6	1.0	3.5	1.0	-	.7	.1	-	3.4
Florida	1.1	.4	20.9	.2	3.6	6.1	.6	2.5	14.5	.6	25.3
Georgia	3.8	14.3	.8	.1	4.3	2.1	.5	2.9	4.4	1.0	3.1
Louisiana	5.4	20.1	.4	4.6	2.1	.6	9.4	.5	.1	-	2.4
Mississippi	13.5	6.1	-	.2	5.3	.2	.3	.6	-	.4	3.4
North Carolina	9.1	1.0	1.6	1.4	2.2	13.7	7.7	6.6	1.7	6.3	3.0
Oklahoma	1.5	.1	-	.6	.9	-	6.6	.3	6.3	1.1	1.0
South Carolina	7.5	10.0	.5	.2	2.9	2.1	1.7	5.9	1.5	4.3	2.6
Tennessee	.3	-	.8	.5	.1	.7	.6	1.5	-	1.2	.4
Texas	11.1	9.0	-	1.9	16.0	2.5	5.5	.3	3.8	3.9	8.3
North Central State											
Illinois	.1	-	1.4	3.1	2.8	.6	4.3	3.8	1.1	.1	.5
Indiana	.1	-	2.8	8.3	.8	5.1	5.7	3.8	.5	.2	.6
Iowa	.8	-	1.1	2.9	3.3	.1	13.4	.5	1.2	.6	-
Kansas	.1	-	.1	1.3	.7	-	5.5	.6	8.6	.7	-
Kentucky	-	-	.3	.6	.3	.3	.3	1.2	.2	7.1	.1
Michigan	.9	-	8.3	.2	4.1	15.4	7.5	11.9	5.4	1.4	2.7
Minnesota	-	-	-	8.3	.4	-	-	.6	.1	-	-
Missouri	.3	.4	.2	1.7	.9	1.1	1.6	1.2	.3	.3	.3
Nebraska	.2	-	.1	2.1	1.2	1.0	4.5	.6	.8	2.0	.3
North Dakota	.1	-	.2	2.9	.3	3.2	.4	-	.2	-	-
Ohio	.3	-	1.0	2.6	1.0	.8	3.8	2.9	.2	3.7	.1
South Dakota	.1	-	-	8.7	1.2	.1	1.8	.5	-	.8	.1
Wisconsin	-	-	2.9	1.1	1.2	3.5	.1	1.1	.6	.3	-
Rocky Mountain and Pacific Coast States:											
Arizona	1.3	-	.2	.1	3.2	.2	.2	.5	4.8	.1	5.1
California	22.1	.1	4.3	4.3	12.3	3.0	6.9	3.9	18.0	4.5	15.8
Colorado	-	-	-	6.3	.6	-	1.5	-	.7	1.5	-
Idaho	.1	-	.1	1.0	.4	-	-	-	.2	1.0	-
Montana	1.0	-	-	4.7	.4	.3	-	-	.1	-	-
Nevada	-	-	-	.1	-	-	-	-	-	.1	-
New Mexico	3.9	1.2	-	.9	2.4	-	.3	.6	.5	.4	1.9
Oregon	.1	-	1.6	10.5	2.2	.3	1.1	3.0	1.4	-	1.6
Utah	.1	.1	.1	.5	.3	.2	.2	.9	.5	.5	-
Washington	.2	-	.3	6.0	3.5	.1	2.7	1.2	5.8	.4	.1
Wyoming	.1	-	.1	.2	.1	-	-	-	-	.3	.7
Territories:											
Alaska	-	-	-	-	-	-	-	-	-	-	-
Hawaii	-	-	.1	6.0	.4	-	-	-	1.7	-	-
Puerto Rico	.4	-	.1	2.0	.1	-	-	-	.1	-	-

[1] Percentage distribution of calcium arsenate and lead arsenate based on quantities estimated to have been used in 1950-51 only.

[2] Dash indicates values of 0.05 percent or less.

TABLE 2.- Regional Distribution of Pesticides Expressed in Percentage of the Quantity Estimated to Have Been Used in the Crop Year 1950-51 (except as noted)

PESTICIDE	NEW ENGLAND AND MIDDLE ATLANTIC STATES	SOUTHERN STATES	NORTH CENTRAL STATES	ROCKY MOUNTAIN AND PACIFIC COAST STATES	TERRITORIES
Insecticides:					
Aldrin[1]	1	90	2	7	.[2]
Arsenic	13	14	11	62	-
Benzene hexachloride[1]	2	66	3	29	-
Calcium arsenate[1]	5	92	1	2	-
Chlordane[1]	16	34	17	30	1
Chlorinated propane deriv.	1	31	2	14	52
DDT[1]	13	43	18	25	1
DDD (TDE)	11	12	5	72	-
Dieldrin	1	91	2	6	-
EPN	17	13	56	14	-
Ethylene dibromide	11	25	-	22	42
Ethylene dichloride	-	78	16	6	-
Grain fumigants (liquid)[1]	5	33	49	13	-
Lead arsenate[1]	48	21	27	7	-
Methoxychlor	30	16	39	15	-
Nicotine sulfate	47	6	19	28	-
Paradichlorobenzene	4	55	40	1	-
Parathion[1]	15	32	19	32	2
Pyrethrum[1]	11	50	21	18	-
Rotenone[1]	50	24	17	9	-
TEPP[1]	8	24	6	62	-
Toxaphene[1]	-	94	3	3	-
Fungicides:					
Copper compounds[1]	38	24	31	7	-
Dithiocarbamates[1]	35	30	31	4	-
Lime-sulfur, dry	54	3	42	2	-
Lime-sulfur, liquid	40	6	20	34	-
Organic mercurials	7	21	50	22	-
Pentachlorophenol	-	30	18	1	51
Sulfur, conditioned[1]	13	57	5	25	-
Herbicides and defoliants:					
Ammonium sulfamate	27	43	16	14	-
Borax	1	69	20	11	-
Calcium cyanamide	2	75	1	22	-
2,4-D[1]	2	9	53	29	7
Dinitro compounds[1]	19	41	16	24	-
IPC	-	-	3	97	-
Potassium cyanate	20	17	26	18	-
Sodium chlorate	2	12	47	29	10
Sodium cyanamide, mono	-	70	-	30	-
TCA	1	5	19	6	69
2,4,5-T	2	15	51	32	-
Miscellaneous:					
Phenothiazine	20	7	69	5	-
Sodium fluoride	14	13	60	13	-

[1] For crop years 1949-50 and 1950-51 combined.

[2] Dash indicates values of 0.4 percent or less.

pests generally during 1950-51 was not so great as in 1949-50, although larger acreages of certain crops were planted which made necessary the use of larger quantities of pesticides than had ever been used in this country in any one year. The pattern of distribution of the 11 major pesticides among the states and territories, was based on the total quantities of each of the materials used nationally during the two-year period, October 1949 to September 1951, inclusive. This gives a current indication of the area requirements for each of the materials studied in detail. It should be understood, however, that for purposes of this study, usage is assumed to be equivalent to domestic disappearance at the producers' level. This procedure does not take into account considerable variations in the stocks existing in the distributional "pipeline."

Regional patterns of use of each of 42 pesticidal materials expressed as percentages of the total quantities used nationally in 1950-51 are shown in table 2. These data, calculated from the state pesticide studies of the quantities estimated to have been used in 1950-51, are shown for five major geographical regions. The states and territories comprised in each of the five geographical regions are as listed in table 1.

A study of the percentage of distribution by regions of the total quantity of each pesticide used in the period covered by the surveys shows that the pattern of use of pesticides is related directly to the occurrence of major pests against which the materials are most widely employed, but it does not indicate the potential for each region if pesticides were to be used to the fullest extent economically feasible to control all pests, some of which are now only partially controlled or for which no control by chemicals is at present applied. Knowledge of the proportion of total quantities of each of the materials used nationally in 1950-51 in each region should assist in determining the proportion of the current production of pesticides which will be needed in each region.★★

Pesticide distribution pattern is related directly to occurrence of major pests, but does not indicate potential for regions if materials were to be used to fullest extent

Literature Cited

Shepard, H. H. 1952. Estimated Requirements for Pesticides, 1952. Agr. Chemicals 7 (4): 73, 75, 77.

"Great Potential For industry" Seen by Coleman, Totman and Others at 27th Annual Meeting of National Fertilizer Assn.

A REGISTRATION of nearly 800 at the 27th annual meeting of the National Fertilizer Association at the Greenbrier hotel, White Sulphur Springs, W. Va., broke all previous attendance records, according to NFA spokesmen. The meeting, held June 16-18, featured Senator Karl E. Mundt, S. Dakota; Allen B. Kline, president, American Farm Bureau Federation; Dr. Milton S. Eisenhower, president of Pennsylvania State College, State College, Pa.; John H. Stambaugh, assistant to the Secretary of Agriculture, Washington, D. C.; J. E. Totman, chairman of the NFA board of directors; and Russell Coleman, NFA president.

A meeting of the Plant Food Research Committee featured a panel with George V. Taylor, Spencer Chemical Co., Kansas City, as moderator, and Dr. Edwin Kapusta, NFA, secretary. Other participants of the panel included Richard E. Bennett, Farm Fertilizers, Inc.; F. W. Darner, U. S. Phosphoric Products Division, Tennessee Corp.; R. M. Jones, Nitrogen Division, Allied Chemical & Dye Corp.; R. A. MacDonald, International Minerals & Chemical Corp.; and H. B. Siems, Swift & Co., Chicago.

In his address of Tuesday morning, Mr. Totman reviewed the fertilizer raw materials situation, stating that about 1½ million tons of nitrogen will be available for agriculture for the 1952-52 season, but solid forms of nitrogen are in short supply, particularly sulfate of ammonia. "Until we have greater quantities of sulfate of ammonia or find some new methods of formulating, it may well be that a large percentage of our nitrogen for row crops and small grains will have to be applied as top or side dressing," he said.

Curtailment of the amount of sulfur available for agricultural use is responsible for loss of production in superphosphate, Mr. Totman pointed out. He reminded that the USDA has reported a probable deficit of 650,000 tons of sulfur for agricultural requirements for the 1951-52 year. Although more sulfur may be available in the future (1954-55) a greatly increased demand will more than cancel out the advantage and make a shortage of some 925,000 tons of sulfur for agricultural use.

As to potash, the board chairman declared that the supply is "better." He reported that slightly more potash is being produced by the five older companies; that a new producer in the Carlsbad area is already shipping and that another, in the same area, is to begin shipments in November. Imports are also higher and this, coupled with the possibility of exploiting still another potash area, makes

Board Members Elected

The new chairman of the NFA board of directors is Louis Ware, president of International Minerals & Chemical Corp., Chicago. As chairman, he succeeds J. E. Totman, Summers Fertilizer Co., Baltimore. Vice chairman is E. A. Geoghegan, Southern Cotton Oil Co., New Orleans, succeeding Mr. Ware.

Acting on the report of E. A. Geoghegan, chairman of the Nominating Committee, NFA members have chosen the following as new directors at large: J. C. Leppart, Mathieson Chemical Corp., Baltimore, Md.; Russell Coleman, president, The National Fertilizer Association. These men are newly elected directors of the following districts: (9) James D. Dawson, Jr., Fidelity Chemical Corp., Houston, Texas; (10) C. J. Cahill, Rath Packing Co., Waterloo, Ia.; Jack B. Snyder, Snyder Chemical Co., Topeka, Kans.; (11) Henning Waltersdorph, Magnolia Fertilizer Co., Seattle, Wash.

possible the availability of 2,185,000 tons of K_2O in 1954-55 as compared to 1,515,000 tons for the 1951-52 season.

Because of the sulfur shortage, a number of fertilizer manufacturers have begun consideration of the several processes of using nitric acid in production of available phosphates, Mr. Totman said. Mixtures of nitric and sulfuric acid are under experimentation, and one such process ammoniates, adds potash and produces a complete fertilizer, he said. However, one of the obstacles in the adoption of such methods is the necessity for large, completely-integrated plants, including nitrogen fixation plants, nitric and sulfuric acid plants, acidulating plants and mixing plants,

In the photos. Top row, (L to R) Mrs. W. A. Minor and Mr. Minor, assistant to the Secretary of Agriculture, Washington, D. C.; L. Ralph Boynton, U. S. Potash Co., Atlanta; Gus Ashcraft, Ashcraft-Wilkinson Co., Atlanta; and Frank M. Feffer, Jr., Arizona Fertilizers, Inc. Phoenix, Ariz.

Second row: Dr. H. B. Mann, president, American Potash Institute, Washington, D. C.; John B. Zimmer, Southwest Potash Corp., New York; Sam Gray, American Potash Institute; and W. A. Maddox, Jr., Southwest Potash Corp., Atlanta. Wm. W. Johnson, Smith-Rowland Co., Norfolk, Va.; Olaf Wolff, Consolidated Mining & Smelting, Montreal, Que., Canada; L. I. Jones, U.S.D.A. Extension Grasslands coordinator, Washington, D. C. and Dr. M. H. McVickar, NFA agronomist.

Third row: Mrs. John F. Gale and Mr. Gale, NFA economist; Ed. Kitchen, Fred Corkill and James Naftel, Pacific Coast Borax Co.

Fourth row: Dr. J. W. Turrentine, president emeritus, American Potash Institute, Washington, D. C.; Dr. F. W. Parker, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.; and Horace M. Albright, U. S. Potash Co., New York. Bill Nichols, Sylacauga Fertilizer Co., Sylacauga, Ala.; Ray King, Georgia Fertilizer Co., Valdosta, Ga.; and C. J. Ball, Phillips Chemical Co., Norfolk, Va.

Fifth row: Dr. H. B. Siems, Swift & Co., Chicago, retiring chairman of NFA Plant Food Research Committee and H. H. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio, new chairman. Drs. Arthur Smith, Mathieson Chemical Corp. and J. F. Fudge, president of American Association of Fertilizer Control Officials, College Station, Texas.

Bottom row: Charles H. MacDowell, Winter Park, Fla., George E. Petitt, Potash Company of America, Washington, D. C. and King Ludington, Chase Bag Co., New York. M. S. Hodgson, Empire State Chemical Co., Athens, Ga. and Weller Noble, Pacific Guano Co., Berkeley, Calif.

complete to the bagging machines to handle the final product. He termed as "unthinkable," the discarding of hundreds of present fertilizer manufacturing plants to make way for new and integrated large plants. ,

Coleman Reports

PROGRESS made by the National Fertilizer Association was cited by Dr. Russell Coleman, NFA president, in his annual address of Tuesday morning. Looking back on the past, considering the present and peering into the future, Dr. Coleman told his audience that within the past 25 years, fertilizer usage on pastures has increased from practically no tonnage to about a million tons in 1951. In addition, the Association has sponsored fertilizer placement experiments to increase the effectiveness of the material applied.

He pointed out how the Association has served as liaison between government agencies and the industry, and has interceded with government in obtaining critical materials for the fertilizer industry during periods of emergency.

Citing the need for greater food production to meet the increased population of the U. S., the NFA head said that by 1955, we will need 70% more nitrogen, 55% more P_2O_5 and 51% more K_2O than were used in 1951. These amounts of fertilizer will be needed, he said, to increase efficient production on the farm; to continue to lower the relative cost of food; to protect soils from erosion and to produce enough food to sustain a larger population.

However, the industry must be maintained at a high productive level, and it must see that the theoretical fertilizer needs are converted into actual fertilizer usage on the farm.

A great undeveloped market exists for the fertilizer industry, Dr. Coleman pointed out. With 95% of grassland and 75% of cropland in the U. S. receiving no fertilizer, there are not many industries which enjoy such a potential. He quoted figures to indicate that only by using ample amounts of the right plant food, can growers increase yields enough to offset low market prices in case this should happen. "Fertilizer is the farmer's guardian against bankruptcy," he said. So far as surpluses are concerned, he said that these will not occur if proper fertilizer is used in conjunction with other good management practices. In this way, greater production may be obtained from smaller areas, thus lowering production costs.

Industry Liabilities

ALONG with the assets of the industry, certain liabilities also exist. Among the most notable in this regard, is the farmer's buying psychology. Usually an individualist, he has bought fertilizer in the past when money was easy but tried to do without plant food purchases when dollars were scarce. "Our job is to convince the farmer that his fertilizer purchases must not be dependent upon the dollars he has in his pocket, but rather that the dollars he wants will be dependent upon the fertilizer he buys."

In addition, the consuming

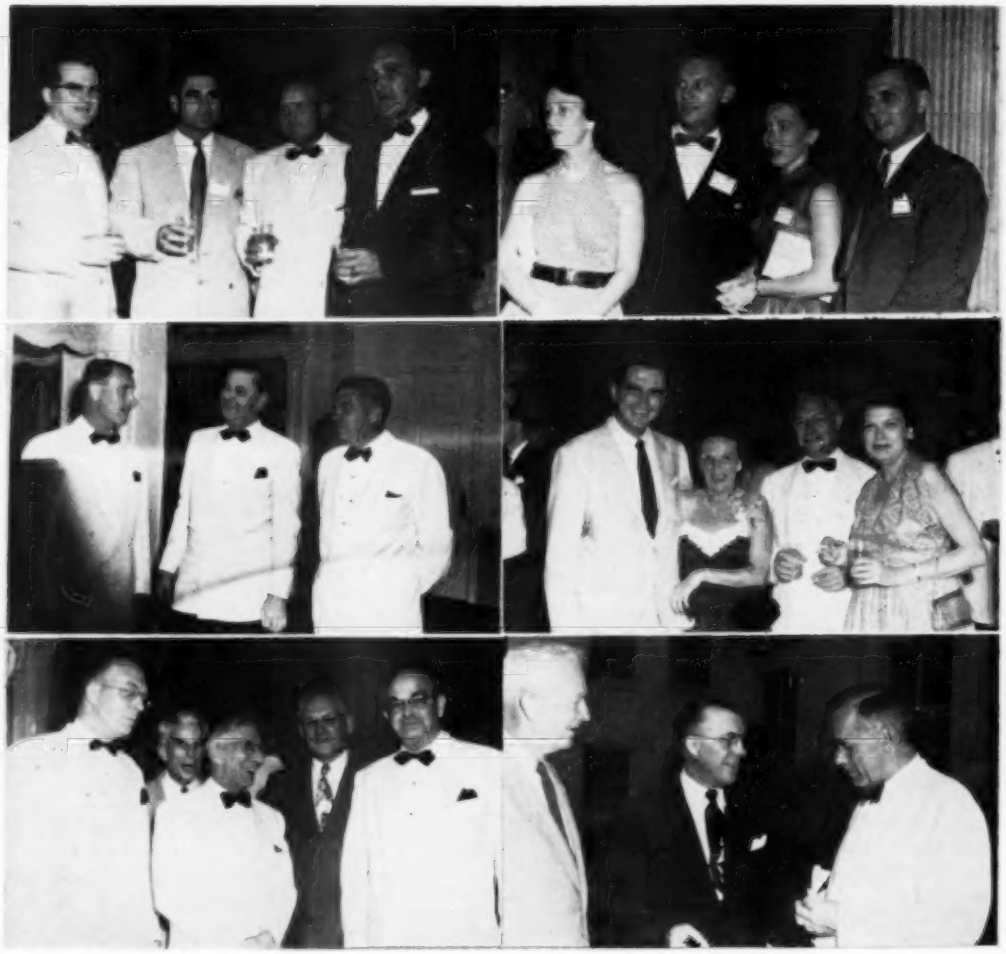
In the photos, top row, (L to R): Mrs. Maurice H. Lockwood; Mrs. Neil McClarnan, Miss Miriam C. Vance, National Fertilizer Assn.; Mr. Lockwood, vice-president, International Minerals & Chemical Corp., Chicago; and Mr. McClarnan, the Jaite Co., Chicago, Ill. Mrs. L. G. Porter, Mr. Porter, U. S. Dept of Agriculture, Washington, D. C.; H. E. Bingham, (face almost hidden), Spencer Chemical Co., Kansas City; Claude E. Byrd and Mrs. Byrd, Spencer Chemical Co.; Ray White and Kenneth Keith, both of Spencer Chemical Co.

Third photo: Dr. Russell Coleman, president, NFA; Paul Speer, U. S. Potash Co., New York; A. A. Schultz, Reading Bone Fertilizer Co., Reading, Pa.; T. M. Cramer, U. S. Potash Co., Carlsbad, N. M.; A. D. Kincaid Southern Cotton Oil Co., New Orleans, and E. A. Geoghegan, also of Southern Cotton Oil Co.

Fourth row: Mrs. George Petitt; Dr. H. B. Mann; Mrs. J. W. Hall and Mrs. E. J. Buhner, Louisville, Ky.

Fifth row: R. P. Thomas, International Minerals & Chemical Corp., Chicago, Ill.; Mrs. Thomas; Mrs. F. W. Atkinson, and Mr. Atkinson, International Minerals & Chemical Corp., Hartsville, S. C.

Bottom row: Dr. H. R. Albrecht, Penn State College, State College, Pa.; Mrs. Albrecht, and Dr. J. F. Fudge, College Station, Texas.



public has little appreciation of the value of fertilizers in our over-all economy. This becomes serious when banks refuse to make loans either to manufacturers for expansion, or to farmers for purchasing fertilizer for a crop. Bankers should be informed that at present commodity prices, the farmer realizes an average return of $3.75 for each dollar invested.

The seasonal aspect of the fertilizer business is also a liability, he pointed out. Increased emphasis on year-round pasture fertilization may help some, but the only answer to the problem is the creation of greater storage facilities.

Calling upon the industry to step up its sales efforts to keep pace

In the photos: Top Row, (L to R): M. E. Gibbons, E. I. du Pont de Nemours & Co., Wilmington, Del.; Bordon Chronister, Nitrogen Division, Allied Chemical & Dye Corp., Richmond, Va.; J. H. Bryant, Phillips Chemical Co., Tampa, Fla.; and Bill Scanlan, Phillips Chemical Co., Bartlesville, Oklahoma. Mrs. Frank Kennedy, Mr. Kennedy, Potash Company of America, Peoria, Ill.; Mrs. Edwin Kapusta and Mr. Kapusta, National Fertilizer Association, Washington, D. C.

Second row: Ed. Kitchen; Leroy Donald, Lion Oil Co., El Dorado, Arkansas, and Dick Goldthwaite, Lion Oil Co., El Dorado. MacRea Parker, Jr., American Cyanamid Co., Lynchburg, Va.; Mrs. W. S. Tyler, Red Star Fertilizer Co., Sulphur Springs, Texas; and Mr. & Mrs. Jack B. Snyder, Snyder Chemical Co., Topeka, Kansas.

Lower row: Frank H. Cappy, American Cyanamid Co., New York; James Gorman, American Cyanamid Co., New York; Stewart P. Bartchelder, Long Island Produce & Fertilizer Co., Riverhead, N. Y.; F. W. Heidinger, Bennett & Clayton Co., Inc., Prospect Plains, N. J.; and T. L. Wilkerson, American Cyanamid Co., New York. Dr. F. W. Parker, USDA, Beltsville, Md., Dr. Milton Eisenhower, president, Pennsylvania State College, State College, Pa.; and Robert H. Engle, NFA, Washington, D. C.

with greater population and to strengthen its good working relationship with various state and federal agricultural agencies, the president said that both need to be done to meet the coming challenge.

Speaking on "Agriculture — An American Business Opportunity," John H. Stambaugh, assistant to the Secretary of Agriculture, Washington, D. C. reiterated the fact that increased production on American farms must be in a vertical, rather than a horizontal direction. No more land remains to be opened, he reminded, which means of course, greater production from the acres now under cultivation.

While mechanization has made more land available for the raising of human food, both from the standpoint of speeding up farming operations and releasing about 65 million acres of land once used to produce feed for 27 million horses and mules on farms, we still need more production.

He pointed out the importance of chemicals for control of insects and plant disease, but stated that the basic need is the positive function of increasing crop yields. This is the job of fertilizer, he said. The great importance of fertilizer in the present-day agricultural economy explains the USDA's keen interest in maintaining adequate supplies of plant food.

Much is yet to be learned about proper placement of and other facts about fertilizer before the maximum utilization of the material can be realized. As to placement, he said, we need to know more about the amount of fertilizer placed and the time it is placed. This involves the number of crops grown, many varieties of each crop, and the varying soil and climatic conditions under which they are grown.

Urging the bringing together of all existing physical response data for different crops and different soil types, the assistant Secretary said that although long-range research is indispensable, existing data should be studied now for use in the years immediately ahead.

Superphosphate production is another field requiring action, he declared. With the sulfur shortage hampering superphosphate production and the knowledge that nitric acid may be used as a substitute for sulfuric acid in this process, he asked "What are we waiting for?" He said that the federal government should "take agressive steps to launch the nitric acid process in this country." Also, that every possible incentive should be given companies willing to risk installing the new process.

Another place for greater action, he suggested, is in the field of farmer education. Several fertilizer companies, he said, are proving that there is no good substitute for demonstration plots to show farmers on their own farms, what fertilizer can do for them. He commended the NFA for its efforts to reach the growers with literature and moving pictures as educational media.

Invited to make a few remarks as part of Tuesday's program, Cedric Gran, OPS consultant, told the group that the Office of Price Administration doesn't know how important fertilizers are to the welfare of the nation, and that the industry will have to make its voice heard in Washington in order to get any kind of favorable consideration. He said it is high time for industry to let the facts be known in the right quarters. He urged the manufacturers present to put up a "squawk" to get relief in transportation costs, at least.

Senator Karl E. Mundt, South Dakota, following Mr. Gran, seized upon his statement, and condemned "Government by Squawk," which he said is too much the case today. He diagnosed many of the country's ills as being "malignant governmentitis" which weakens and destroys as the people sip its poisons.

"For more than 300 years," he said, "Immigrants came to America seeking freedom of all kinds." During that period, the greatest export from the U. S. was the *idea* of freedom. Contrasted to this, today, is the seemingly endless importation of ideologies, most of them dangerous. This is happening for the first time in the nation's life, he said, with the resultant switch from freedom to progress

(*Turn to Page* 107)

CONTEST WINNERS

Men's Golf

June 16: Low Gross: Winner, John R. Rice, Liberty Limestone Corp., Buchanan, Va.; runner-up, Baxter Dungan, Universal Paper Bag Co., New Hope, Pa. . . . *Match Play:* Winner, E. W. Harvey, Nitrogen Div., Allied Chemical & Dye, New York City; runner-up, John P. Burrows, International Minerals & Chemical Corp., Chicago, Ill. . . . *Kickers' Handicap:* Winner, W. W. Johnson, The Stadler Fertilizer Co., Cleveland, O.; runner-up, L. C. Oakley, Jr., U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla. . . . *Medal Play:* Winner, R. W. Goldthwaite, Lion Oil Co., El Dorado, Ark.; runner-up, J. L. Baskin, International Minerals & Chemical Corp., Orlando, Fla.

June 17: Low Gross: Winner, Watts Gunn, Chilean Nitrate Sales Corp., Atlanta, Ga.; runner-up, B. A. Crady, U. S. Potash Co., Meridian, Miss.; . . . *Kickers' Handicap:* Winner, H. E. Bingham, Spencer Chemical Co., Kansas City, Mo.; runner-up, Charles F. Martin, Miami Fertilizer Co., Xenia, O. . . . *Medal Play:* Winner, W. B. Porterfield, U. S. Potash Co., New York City; runner-up, William A. Webster, Quaker Oats Co., Chicago, Ill. . . . *Match Play:* Winner, H. A. C. Rauchfuss, The Dickerson Co., Philadelphia, Pa.; runner-up, C. T. Prindeville, Swift & Company, Chicago, Ill.

Veterans: Medal Play: Winner, J. B. McConnaughey, Kentucky Fertilizer Works, Winchester, Ky.; runner-up, M. S. Hodgson, Empire State Chemical Co., Athens, Ga. . . . *Kickers' Handicap:* Winner, John A. Miller, Price Chemical Co., Louisville, Ky.; runner-up, J. W. Rutland, International Minerals & Chemical Corp., Chicago, Ill. . . . *Match Play:* Winner, Weller Noble, Pacific Guano Co., Berkeley, Calif.; runner-up, M. V. Bailey, American Cyanamid Co., Bronxville, N. Y.

Guest Golf: Low Gross: Winner, John A. Nicholson, Agricultural Chemicals, New York City; runner-up, Ross McDade, Jr., Gulf Liquid Fertilizer Co., Wharton, Tex. . . . *Kickers' Handicap:* Winner, A. R. Bethke, Darling & Co., Chicago, Ill.; runner-up Ray L. Pavlak, Wisconsin Cooperative Farm Plant Foods, Madison, Wisc. . . . *Cyanamid Cup:* Winner, Fred A. Koechlein, International Minerals & Chemical Corp., Chicago, Ill.

June 18: Low Gross: Winner, R. H. Linderman, International Minerals & Chemical Corp., Atlanta, Ga.; runner-up, W. A. Bridgers, Agricultural Products Lab., Wilson, N. C. . . . *Kickers' Handicap:* Winner, W. J. Murphy, American Potash & Chemical Corp., New York City; runner-up, Nelson Myers, Texas Gulf Sulphur Co., New York City. . . . *Medal Play:* Winner, G. R. Monkhouse, Shell Chemical Corp., San Francisco, Calif.; runner-up, L. H. Wright, Phillips Chemical Co., Bartlesville, Okla. . . . *Match Play:* Winner, Jack Bryan, Phillips Chemical Co., Tampa, Fla.; runner-up, Connie Ferrell, Georgia Fertilizer Co., Valdosta, Ga.

New Chemical Agent Makes Possible Complete

Control of Iron Chlorosis

by

C. C. Alexander and David Walsh

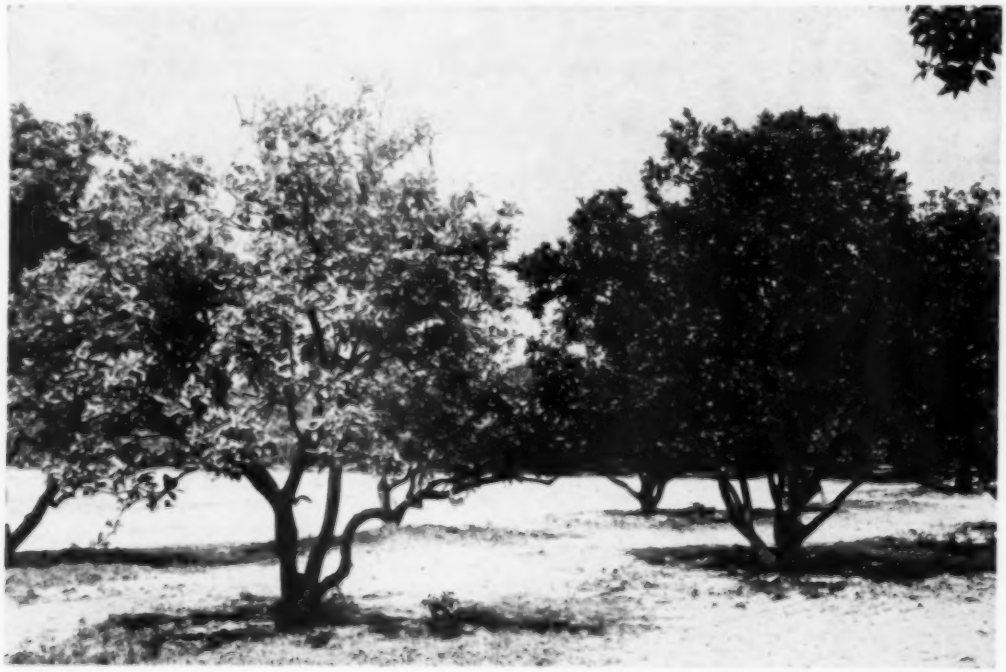
Geigy Company, Inc., New York

MINERAL deficiencies in crops have existed for a long time, and to find a solution to their problems has required much research over the past 50 years. At the moment, however, research, personified by Ivan Stewart and C. D. Leonard* of the Florida Citrus Experiment Station in Lake Alfred, is working on its hottest lead and is apparently making good headway.

Stewart and Leonard have uncovered a formulation that may provide the solution to the problem of how plants may be enabled to assimilate minerals in which they are deficient. The formulation is a combination of salts of ethylenediamine tetraacetic acid ("EDTA") and the required mineral. The solution sounds simple, of course, as they usually do. But research conducted during the past half century attests to the intri-

The tree at left (below) shows strong symptoms of iron deficiency. Contrasted to it is the tree on the right, treated with less than 2 ounces of chelated iron on the soil. At time of treatment, the two trees were about equally affected with chlorosis.

*Stewart, Ivan and Leonard, C. D. Iron Chlorosis—Its possible causes and control. Citrus Magazine. 14(10) 22-25 1952.



cacy of keeping minerals in suitable form to permit their ingestion by plants.

Field tests during the past year involving iron-deficient orange trees, produced positive results and the realization that at last there may be a practical answer to ending iron chlorosis in trees. This realization is based on the fact that trees treated with the iron complex during the dormant season last winter became green in about six weeks after application. There was a following reaction this spring in which many of the treated trees produced new growth and bloomed three weeks before trees that were untreated.

Applications of the iron complex were made to the soil at the base of the trees, resulting in deep green leaves and luxuriant growth. The amount of iron found in the leaves of the new spring growth almost doubled that found in leaves from nearby untreated trees or in leaves of trees treated with 15 pounds of iron sulphate.

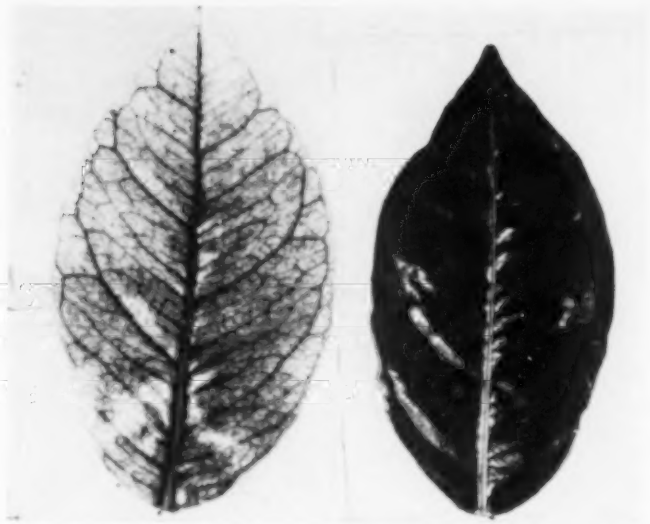
As research progresses, it is expected that yields in iron-deficient areas will be greater and that the fruit will be of a superior quality.

When work began last year to discover the answer to iron chlorosis in citrus, the researchers were confronted with the fact that iron chlorosis is common throughout the citrus growing area of Florida as well as in almost every major fruit producing section in the world. They knew, too, that iron deficiency is the most difficult of all nutritional deficiencies to correct.

Top photo: chlorotic corn plant response to treatment with iron sequestrene. Note how healthy stripes are appearing on yellow leaf.

Middle photo: Stunted orange tree (3 years old) planted in iron-deficient soil.

Lower photo: Orange tree with dieback caused by iron deficiency.



Leaf on the left is in advanced state of iron chlorosis. Leaf on right from tree treated with 20 grams of chelated iron.

Logically, among the first steps taken was the examination of the evidence produced by other research workers throughout the world. Much probing along these lines contributed little or nothing. Then, research got its foot in the door. The opening wedge was in the form of an apparatus to inject solutions of iron into trees under high pressure.

A solution of 100 grams of iron sulfate in a gallon of water was prepared. The injection was made and ten minutes later, iron was detected by chemical test in the top of the trees. Indication of the entire solution required from half an hour to two hours. A week or two later, a new dark green growth had replaced the chlorotic or yellow leaves. (At this writing in mid-summer all of the injected trees have green foliage.)

The next step was to devise a more practical method of application of the iron and, of course, induction through the roots was the natural approach. However, when roots of chlorotic trees were placed in solutions of iron sulphate the trees revealed no consumption of iron. Citric acid was added to the solution and the leaves became considerably greener. But, when this solution was applied to the soil around chlorotic trees, there was no reaction because although iron citrate is used extensively in nutrient solutions as a source of iron, the citrate ion is vulnerable to soil microorganisms. These microorganisms reduce the iron to a form unsuitable for plants growing under field conditions.

At this point, help came from another front. Jacobson*, working in California, reported that the iron supply could be maintained in nutrient solutions by single additions of ferric potassium ethylenediamine tetraacetate. In other words, "Edta" was able to do what citrate had failed to do: namely, to maintain iron in solution so that a substantial amount would be available for plant assimilation in but a single application, whereas multiple applications of iron citrate would be required to achieve comparable results.

As a consequence, Alrose Chemical Co., Providence, R. I., a Geigy subsidiary, was called into consultation for the required "Edta" and to help with research. To date, the cooperative research of the Lake Alfred Station and Alrose Chemical Co. under the direction of H. Zussman, has broadened the plane of this new field of exploration considerably. Research has spread to other mineral deficiencies such as copper, zinc, manganese, cobalt, magnesium and others.

One interesting sidelight in this new approach to the problem of mineral deficiencies, is the fact that such organic compounds as "Edta" are called chelating agents, a name that is derived from the Greek word meaning claw. Stewart and Leonard's description of the action of chelating agents is simply, "The organic molecule acts like two jaws and removes metal ions from solutions. The reaction is reversible."

In any event, various combinations of iron were chelated and applied to the soil around chlorotic trees this past winter, with results that promise the eventual elimination of chlorosis in citrus.

Iron deficiency in citrus is revealed in the leaves. For instance, mild cases present leaf veins that are darker green than the intervenial areas. In more advanced cases, the intervenial areas are yellow and eventually the entire leaf may become partially defoliated, causing dieback. The fruit fails to color properly, production is reduced and in many instances the trees die.

It should be noted that the experiments conducted to date have been successful only on acid soils. Experiments based on new dry chelates are underway to determine their effectiveness in fertilizers. The dry Fe "Edta" under test contains 8 to 13 percent iron. The only statement available on this work is that "no undesirable effects have yet been produced except where large amounts of the chelate have been applied."

Although application of iron complex in dry form has been emphasized, applications of sprays to the leaves also is promising in the correction of iron chlorosis.

The growing concern of increasing populations and decreasing food supplies throughout the world may well be reduced when complete data have been compiled to give agriculture full benefit from the various mineral complexes now under investigation.★★

*Jacobson, Louis. Maintenance of Iron Supply in Nutrient Solutions by a single Addition of Ferric Potassium Ethylenediamine Tetraacetate. Plant Physiol. 26: 411-413. 1951

Bright Prospects For Fertilizer Industry Seen by Speakers as

American Plant Food Council Meets

Participants in APFC panel: (L to R): Dr. Paul D. Sanders, moderator; Herschel Newsom; Dr. Byron T. Shaw (standing); O. V. Wells; and D. Howard Doane.

SPEAKERS representing the industry, federal and states agencies, the U. S. Department of Agriculture and the National Grange were featured at the seventh annual meeting of the American Plant Food Council at the Homestead Hotel, Hot Springs, Va., June 19-22. The convention attracted some 550 persons from many parts of the country.

Paul T. Truitt, president of the Council, presented his annual address on the opening morning, pledging the support of fertilizer manufacturers in furnishing agriculture with the essential plant foods with which to feed a rapidly growing population from cropland acreages now under cultivation.

"The growth of the population and the comparatively small arable acreage, guarantee the need for an increasing total agricultural output," he said. "The fertilizer industry in light of past performance is planning to meet this need for more food and fiber by producing enough fertilizers to do the total job."

Mr. Truitt said that "each year since 1938, the fertilizer industry has reached a new high in delivering fertilizer to the farmers," adding that "this means that, since 1938 when we produced 7½ million tons, the demand has now increased to 21 million tons, plus."

He explained that consumption of commercial fertilizer for the crop year ending June 30, 1951 "represents a 14 percent increase over the previous crop year" or "the largest use of fertilizer ever recorded."

"The fertilizer industry looks to the future with confidence in the farmer and confidence in our ability to serve him within the framework of the private enterprise system," Mr. Truitt said. He called for "the fullest cooperation and support of the fertilizer use educational program being sponsored by the U. S. Department of Agriculture in the Land Grant Colleges. Mr. Truitt emphasized the importance of adequate and aggressive education and research programs, adding that "there is a wide gap between proven research findings and the application of these findings on the farm."

He said that "we all should continue to work for an informed public opinion about fertilizers, their re-

WILSON HONORED

Louis H. Wilson, secretary of the APFC and its director of information, has been named an honorary life member of the American Farm Editors Association, it was announced at the meeting. Only two other persons have been honored likewise, in the history of the group whose readers number 15 million. The other two are George Krieger, Ethyl Corp., New York, and Frank Mullen, executive vice-president of the National Broadcasting System, New York.

lationship to a sound land-management program, to the total food supply, to the prosperity of agriculture, and to the national defense."

Projecting moving pictures on a screen to illustrate points of his talk, Dr. C. J. Chapman, extension specialist in soils, University of Wisconsin, Madison, spoke on "Fertilizers and Soil Improvement in Wisconsin." He described pastures as a "neglected crop" and emphasized that "improvement of pastures for our livestock is our one great and last opportunity for low cost feed production."

"More abundant pastures will

In the photos: top of page, L to R: Senator Harry F. Byrd, principal speaker at banquet; Mrs. George E. Petitt; Paul T. Truitt and Mrs. Harold D. Cooley.

Second row, (L to R): R. R. Hull, I. P. Thomas & Son Co., Camden, N. J. and Fred J. Woods, Gulf Fertilizer Co., Tampa, Fla. Dr. Byron T. Shaw, Administrator, Agricultural Research Administration, U.S.D.A.; Mrs. John V. Collis, Louisville, Ky. and John E. Sanford, Armour Fertilizer Works, Atlanta, Ga.

Third row: George Servine, GLF Soil-Building Service, Ithaca, N. Y.; D. Howard Doane, St. Louis, Mo., and W. A. Minor, chairman of U.S.D.A. Fertilizer Policy Committee and assistant to the Secretary of Agriculture. Alex M. McIver Charleston, S. C.; James R. Rossman, Woodruff Fertilizer Works, North Haven, Conn. and M. W. Whipple, Olds & Whipple, Inc., Hartford, Conn.

Fourth row: John McDonald, agricultural director, WSM, Nashville, Tenn.; and Joseph A. Howell, president, Virginia-Carolina Chemical Corp., Richmond, Va. Newly-elected members of AFFC executive committee: Paul T. Truitt, president; George E. Petitt (ex-officio); John V. Collis, Federal Chemical Co., Louisville; James F. Doetsch, Chilean Nitrate Sales Corp., New York, (chairman); C. B. Robertson, Robertson Chemical Corp., Norfolk; and W. T. Wright, F. S. Royster Guano Co., Norfolk. (George W. Gage, also a member, was absent at picture time.)

Next-to-bottom row: Dr. J. F. Fudge, College Station, Texas; Dr. Sam F. Thornton, F. S. Royster Guano Co.; and Z. H. Beers, Middle West Soil Improvement Committee, Chicago. Paul J. Prosser, Jr., The Baugh & Sons Co., Baltimore, and G. Tracy Cunningham, Armour Fertilizer Works, Atlanta.

Bottom row: J. C. Crimey, GLF, Ithaca, N. Y.; Dr. H. F. DeGraff, Cornell U.; and W. T. Wright. Malcolm E. Hunter, Nitrogen Division, Allied Chemical & Dye Corp., Richmond, Va.; Thomas E. Camp, Jr., Southwest Potash Corp., New York; and L. Dudley George, Richmond Guano Co., Richmond, Va.

(Photos by Louis H. Wilson, AFFC.)

make possible greater production of low cost feed, greater production of low cost milk and other food products—and it all fits into a program of grassland farming and 'all-out' production in this critical period," he said.

Prof. Chapman emphasized that "productive pastures along with abundant production from our cultivated fields will contribute to the physical needs of man and make for more abundant living."

He described as "spectacular" the results of 313 pasture demonstrations in Wisconsin during 1951 and 1952. He said that results from 136

In the Photos: Above (L to R) George E. Petitt; Mrs. Robert M. Salter; O. V. Wells, chief, USDA Bureau of Agricultural Economics; and Mrs. C. J. Chapman.

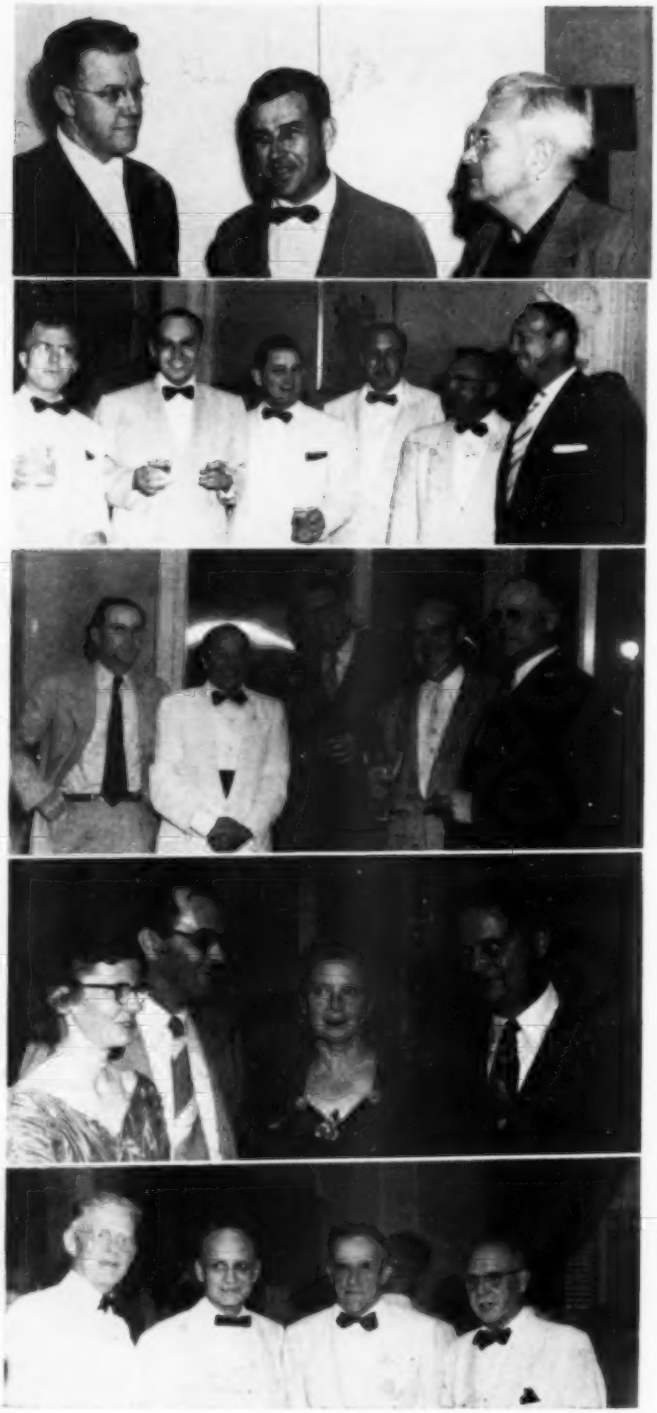
Second row: Claude Byrd, Spencer Chemical Co., aKnsas City; Mrs. Byrd; John C. Sanders; Mrs. Sanders; George V. Taylor and Proctor Gull, all of Spencer Chemical Co. W. A. Maddox, Jr., Southwest Potash Co., New York; Mrs. Walter Hochschild and Mr. Hochschild, American Metal Co., New York; and John B. Zimmer, Southwest Potash Corp.,New York.

Third row: Mr. & Mrs. Howard Doerr, OPS, Washington; K. D. Jacob USDA Beltsville, Md.; and W. T. Doyle, Sturtevant Mill Co. Dorchester, Mass.; R. J. LaMarche, and W. E. Scott, International Paper Co., New York.

Fourth row: H. S. TenEyck, International Ore & Fertilizer Corp., New York; Ed. Phillips, GLF Exchange, New York; Unidentified gentleman; and H. C. Haase, Ochoa Fertilizer Corp., New York. Paul Reagan, American Cyanamid Co., New York; W. T. Wright; F. S. Washburn and John C. Bennett, American Cyanamid Co.

Next-to-bottom-row: Malcolm C. Hunter, Allied Chemical & Dye Corp.; Horace Albright, U. S. Potash Co.; Paul T. Truitt; Frank Keenen, E. I. du Pont de Nemours & Co., Wilmington, Del.; Dudley George, Richmond Guano Co. Richmond, Va.; and Ed Ames, Robertson Chemical Co., Norfolk, Va.; Mrs. Mildred Gallaher, Mrs. C. Cecil Arledge, Mr. Arledge; and Mrs. J. A. Howell, Virginia-Carolina Chemical Corp., Richmond, Va.

Bottom row: J. W. Harding, T. M. Dues and Dr. Ted A. Meyer, all of Federal Chemical Co., Louisville, Ky. Mr. & Mrs. Gordon Cunningham, Tennessee Corp., Atlanta, Ga.



demonstrations, using a 10-10-10 fertilizer, showed an average yield of 6156 lbs. of dry material per acre on fertilized plots, compared to only 2751 lbs. on unfertilized plots, or a net profit of $67.13 per acre from the fertilized pastures.

"This sounds like a fairy story," he said, but continued that nitrogen backed up with an abundance of phosphate and potash together with sunshine and rain, provided protein-rich feed for hungry cattle. "And I am convinced that there is a great opportunity for low cost feed production through the improvement of our pastures," he said. "Many of them are producing only one-half to one-third the amount of forage they might produce if well fertilized."

Flying up from Mexico where he is on a special assignment, Dr. H. F. DeGraff, H. E. Babcock professor of Food Economics, Cornell University, Ithaca, N. Y., spoke to the group on "Fertilizers and the Food Economy." He ranked fertilizers high on the list of production supplies needed by farmers and emphasized that if soil and crop science maintain their advancements, the nation will not particularly need additional acreages to grow the food necessary to feed its expanding population.

"The 157 millions of our present population are eating from the same crop acreage as the 106 million people of 1920, and they are eating

In the photos: Top row (L to R): Harry B. Caldwell, Master, N. Carolina State Grange; C. F. Burroughs, Jr., F. S. Royster Guano Co., Norfolk, Va.; and Herschel D Newsom, Master of the National Grange.

Second row: C. C. Keefer, St. Regis Sales Corp., Louisville, Ky.; E. N. Sheiton, Tennessee Corp., Atlanta; C. A. Woodcock, St. Regis Sales Corp., Chicago; W. A. Harris, St. Regis Sales Corp., Chicago; John Hall, Potash Company of America, Washington, D. C.; and W. R. Huck, St. Regis Sales Corp., Richmond, Va.

Third row: John A. Nicholson, *Agricultural Chemicals*, New York; W. E. Scott, International Paper Co., New York; Peter Colefax, American Potash & Chemical Corp., Los Angeles, Calif.; W. J. Murphy, American Potash & Chemical Corp., New York; and Ed. Phillips.

Fourth row: Mrs. Z. H. Beers and Mr. Beers, Chicago; Mrs. H. H. Tucker and Mr. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio.

Bottom row: W. H. Klee, Naco Fertilizer Co., Jacksonville, Fla.; Malcolm Hunter; George Suggs, Allied Chemical & Dye Corp., New York; and Dexter Sloan, Superior Fertilizer Co., Tampa, Fla.

better," he said. "This is because our food production is now some 60% greater than three decades ago. Some of the increase has come from land released from feeding horses and mules — but fully two-thirds is directly attributable to the advances in agricultural science which have been applied on farms since 1920.

"A conservative estimate is that one-quarter of our total crop production is directly attributable to chemical fertilizers. And if the contribution of pesticides is added, the products of the chemical industry must account for a full third of our annual crop output. This still is not the whole story because the same chemicals are also a most effective form of crop insurance for the other two thirds of the yield."

The final day's session featured talks by Rep. Harold D. Cooley, North Carolina, chairman of the House Committee on Agriculture; a panel discussing "Major Factors Influencing the Future of Agriculture"; and a paper, "We, Too, Have a Job to Do," by W. A. Minor, assistant to the Secretary of Agriculture, Washington, D. C. Moderator of the panel was Paul D. Sanders, editor, *The Southern Planter*, Richmond, Va. Participating on the panel were Dr. Byron T. Shaw, administrator of the Agricultural Research Administration, Washington, D. C.; O. V. Wells, chief of the Bureau of Agricultural Economics, Washington; D. Howard Doane, Doane Agricultural Service, St. Louis, Mo.; and Herschel D. Newsom, Master of the National Grange.

Rep. Cooley defended farmers as being worthy of special consideration and called for continued efforts in their behalf. Since they are the producers of food, fiber and timber, essential to the welfare of the people, they should have a fairer share of the national income. He said that Congress is interested in providing the working machinery which will achieve a better standard of living for all our people. "The Congress is not interested in a program of scarcity nor is it interested in bringing about the production of a surplus beneath which the man on the farm may be buried while the rest of the people go in want.

"The farmers of America believe in free enterprise," Rep. Cooley said. "They hate and despise controls, hamstrings, and hobbles, but they are willing to accept the advice of their government in fixing production goals. American agriculture is the greatest example of free enterprise left in the free world today," he concluded.

Panel Appears

IN prefacing the talks to be presented by members of the panel, Dr. Sanders told the group that "fertilizers are one of the tools which farmers must have, and have in abundance, if our nation is to continue to be the fest fed, best clothed and best housed in the world." He said that factors which must be faced in considering the nation's food production include:

"1. The problem of farm income which must be translated in terms of a fair return for farm products;

"2. The ever-present problem of sound land management so closely associated with income;

"3. The course that legislation should take without regimenting our farm population; and

"4. The problem of furnishing adequate tools for production at a cost the farmer can afford."

Dr. Sanders said that, "private industry has a tremendous stake and responsibility in a successful farming program."

"Industry has a job to do," he added. "Farmers have a job to do and consumers everywhere must face these indisputable facts: Our farm population is decreasing. Our over-all population is increasing rapidly. There are virtually no new land frontiers."

"The farmers of America have met all of the demands made upon them in magnificent fashion and will continue to meet those great demands if the government and the people of our nation will bear their part of the responsibilities involved."

Dr. Sanders emphasized that "our agricultural leadership" has asked for vastly increased quantities of fertilizers by 1955—70% more nitrogen, 55% more phosphate, 51% more potash, compared with the 1951 crop year." He predicted that "in the best traditions of our private enterprise system, the fertilizer industry will meet the challenge."

Appearing first on the panel, Dr. Shaw used slides to illustrate his talk in which he laid upon research, the responsibility for continued gains in the future. "Our first job," he declared, "is to maintain our present dietary level and to do that we must find a way to provide as much additional food and fiber as could normally be expected from seventy million acres of cropland and pastures."

He said that if the nation continues to consume food and fiber at

(*Turn to Page 73*)

APFC NAMES DIRECTOR

At a business session during the convention, the APFC named the following to the board of directors for terms expiring June 30, 1955: Horace M. Albright, United States Potash Company, New York, New York; W. B. Copeland, Smith-Douglass Company, Inc., Norfolk, Virgina; James F. Doetsch, Chilean Nitrate Sales Corp., New York, New York; Edwin Pate, Dixie Guano Company, Laurinburg, North Carolina; G. D. Sloan, Superior Fertilizer Company, Tampa, Florida; W. T. Steele, Jr., Cooperative Fertilizer Service, Inc., Richmond, Virginia; Mac C. Taylor, Oregon-Washington Fertilizer Company, Seattle, Washington; and W. T. Wright, F. S. Royster Guano Company, Norfolk, Virginia.

Joseph C. Kracht, Naco Fertilizer Co., Charleston, S. C., was elected to fill the unexpired term (ending June 30, 1954) of K. D. Morrison (resigned) also of Charleston.

The following members were elected to the executive committee for a one-year term ending June 30, 1953: James F. Doetsch (Chairman), Chilean Nitrate Sales Corp., New York, New York; John V. Collis, Federal Chemical Company, Louisville, Kentucky; George W. Gage, Anderson Fertilizer Co., Inc., Anderson, South Carolina; C. B. Robertson, Robertson Chemical Corporation, Norfolk, Virgina; and W. T. Wright, F. S. Royster Guano Company, Norfolk, Virginia.

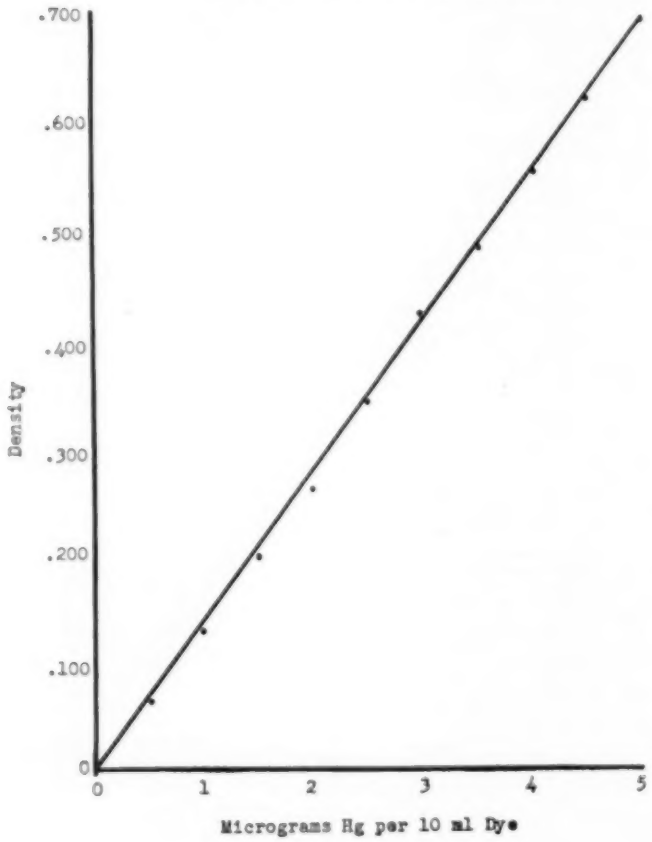
George E. Petitt, Potash Company of America, Washington, D. C., is an ex officio member of the executive committee.

Mercury Spray Residues

Their Estimation on Apples at Harvest Time

PRIOR to 1947, analyses of apple residues for mercury in the Purdue laboratories indicated the presence of contaminants which caused interference with this determination. The results of unpublished work in these laboratories in 1947 and 1948 indicated the mercurials being used were not stable under the varying orchard conditions of heat, light and moisture and that harvest residues, if any, would not be more than a few parts per million. Frequent and serious outbreaks of apple scab and bitter rot have made it very desirable to make greater use of fungicides having the property of burning out established scab infections. As late as in the spring of 1950, the Federal Security Agency was holding hearings and weighing evidence to determine if a need existed for establishing new or adjusting old tolerances for spray materials. The result of this action was that no tolerance was set for mercury, possibly because of the difficulties encountered in its estimation in micro quantities. This emphasized further the need for a satisfactory method for the estimation of mercury in micro quantities.

FIGURE 1. MERCURY STANDARD CURVE



The principle of the method proposed is based on the fact that many metals, including mercury, react with dithizone and related dyes to form red, chloroform-soluble compounds in which the intensity of the red color is proportional to the amount of the metallic ion present. When an aqueous solution of a salt of the metal is shaken with a chloroform solution of the dye, the intensity of the resulting chloroform-dye layer can be measured photometrically. The reaction is controlled by the pH of the aqueous solution, the optimum value of which depends on the element being determined. This permits the determination of one metal in the presence of another in those cases where the optimum pH is sufficiently different (1, 2, 3,). However, copper and mercury, which

by

O. W. Ford

Agricultural Chemistry Department

and

C. L. Burkholder

Horticultural Department
Purdue University
Lafayette, Indiana

often occur together in spray residues, are separated chemically before being determined, since their optimum pH values are very close together.

Method

Reagents and Equipment

1. Distilled water. Redistill from glass and store in pyrex bottles.
2. Nitric acid 15%. Redistill from glass and store in pyrex bottles.
3. HCl 20%. Redistill from glass and store in pyrex bottles.
4. NH_4OH 10%. Redistill from glass and store in pyrex bottles.
5. Di - betanaphthylthiocarbazone (Eastman No. P4834) solution. Dissolve 20mg. of dye in 1 liter of reagent chloroform. This solution was found to be stable if stored in colored bottles.
6. Oxalic acid. Reagent grade.
7. Standard $HgCl_2$ solutions.

Solution A. Weigh 1.4 grams reagent $HgCl_2$ and make to 1 liter with redistilled water. Add sufficient HCl to adjust to pH 2.0. This solution has Hg equivalent of 1 mg./ml.

Solution B. Dilute 10 ml. of solution A with redistilled water to 100 ml. This solution has Hg equivalent of.1 mg/ml.

Solution C. Dilute 10 ml. of solution B with redistilled water to 100ml. This solution has Hg equivalent of .01 mg./ml.

Solution D. Dilute 10 ml. of solution C with redistilled water to 100 ml. This solution has Hg equivalent of .001 mg./ml. or one part per million.

8. KBr 40% aqueous solution. This should be extracted with

TABLE 1

Leaf Samples

Mercury Residue on Plots Receiving Four Sprays by June 20, 1949

Sample	Plot	Time of Sampling	Total rain after spraying (inches)	Number of leaves	Hg. per leaf (Milli-micrograms)
1	A*	Before fourth spray 6/18		50 open	24.0
2	A	After fourth spray 6/18		50 open	98.0
3	B*	Before fourth spray 6/18		50 open	22.0
4	B	After fourth spray 6/18		50 open	54.0
9	A9	After fourth spray 7/5	1.11	50 open	2.0
10	B	After fourth spray 7/5	1.11	50 open	2.0
60	A	Harvest 9/23	7.64	50 bagged	60.0
61	A	Harvest 9/23	7.64	50 open	48.0
59	B	Harvest 9/23	7.64	50 open	2.0
62	B	Harvest 9/23	7.64	50 bagged	2.0
21	C*	Harvest 7/11	1.68	50 open	1.5
22	A**	Harvest 7/11	1.68	50 open	1.5

*Plot A. Received four sprays "Tag" 1/1600 by June 20, 1949.
**A — Received four sprays "Tag" 1/1600 applied by June 20, 1951.
*B — Received four sprays "Puratized Agricultural Spray" 1/800 by June 20, 1949.
C — Received four sprays "Puratized Apple Spray" 1/1600 by June 20, 1949.

TABLE 2

Apple Samples

Mercury Residue on Plots Receiving Four Sprays by June 20, 1949

Sample	Plot	Time of Sampling	Total rain after spraying (inches)	Weight of Apples (g.)		Hg. (P.P.B.)
5	A	Before fourth spray 6/18		650		1.9
6	A	After fourth spray 6/18		670		2.2
7	B	Before fourth spray 6/18		745		0.4
8	B	After fourth spray 6/18		750		3.8
18	B*	July 11	1.68	920		3.0
35	B	July 25	3.00	820		2.5
37	B	July 31	4.42	1290		1.5
19	C*	July 10	1.68	890		1.2
34	C	July 25	3.00	970		4.9
36	C	July 31	4.42	1220		2.3
11	A	After fourth spray 7/5	1.11	610		1.5
12	A	After fourth spray 7/5	1.11	908		0.1
13	B	After fourth spray 7/5	1.11	835		0.1
14	B	After fourth spray 7/5	1.11	750		0.1
17	A	7/10	2.79	880		0.1
20	B	7/10	2.79	930		2.0
33	A	7/25	4.61	1150		1.5
32	B	7/25	4.01	1140		1.6
39	A	7/31	5.43	1380		2.0
38	B	7/31	5.43	1370		2.1
54	A	Harvest 9/23	7.64	1010	bagged	0.1
55	A	Harvest 9/23	7.64	1060	open	0.1
56	B	Harvest 9/23	7.64	970	open	0.1
57	A	Harvest 9/23	7.64	910		0.1
58	A	Harvest 9/23	7.64	990		0.1
63	B	Harvest 9/23	7.64	1110	open	0.1
64	B	Harvest 9/23	7.64	1090		0.1

Plot A. Received four sprays "Tag" 1/1600 by June 20, 1949.
Plot B. Received four sprays "Puratized Agricultural Spray" 1/800 by June 20, 1949.
*B — Received four sprays "Puratized Agricultural Spray" 1/800 by June 20, 1949.
*C — Received four sprays "Puratized Apple Spray" 1/1600 by June 20, 1949.

several ml. of the dye solution before use for removal of heavy metals. When not in use make alkaline with KOH to preserve it, and store in pyrex bottles.

9. A pH meter (Beckman Model G).
10. Photometer with 520 mu filter (Evelyn).
11. Matched colorimeter tubes.

Preparation for Analysis

A two to four pound sample of apples was selected for the estimation of residue. The apple was stripped of residue by dipping it into a 600 ml. pyrex beaker containing 250 ml. of boiling 3% nitric acid and then rinsing it in a like volume of boiling distilled water. The dipping operation was done easily if one impaled the fruit off center on a glass rod. This permitted the fruit to be turned while in the acid bath and aided in the complete removal of residue. The acid wash and rinse solutions were then combined and evaporated nearly to dryness. To help destroy the nitric acid, which might later have affected the dye, 10 ml. of 20% HCl and 0.5 gram of solid oxalic acid were added. The solution was evaporated nearly to dryness and shaken up with 25 ml. of mercury-free redistilled water. This was again evaporated nearly to dryness, 25 ml. redistilled water added, and adjusted to pH 2.0 with ammonia using a pH meter.

The solution was then made to 100 ml. volume with redistilled water which had been adjusted to pH 2.0, transferred to separatory funnel and washed with two separate 10 ml. portions of clear chloroform. The chloroform layer was discarded and water layer of the sample was filtered through glass wool to remove any insoluble material from the apple.

Estimation of Mercury

A standard curve was prepared from stock solution (D) covering the range from 0 to 5 parts per million of mercury using a colorimeter with a 520 mu filter. The colorimeter was set at 100% transmission with a blank of 10 ml. of the dye solution. At least two points on the standard curve were checked with every set of determinations by use of appropriate aliquots from stock solution (D). In actual operation, whether checking points on the standard curve or estimating the mercury content of a sample, an aliquot of the solution to be tested containing not more than 5 micro-grams of mercury was transferred to a small (125 ml. capacity) separatory funnel, 10 ml. of the dye added and the closed separatory funnel shaken rapidly for one minute. After the layers had separated, the chloroform layer was transferred to a colorimeter tube, care being used to exclude water droplets which might have clung to the sides of the tubes and caused interference. The optical density was determined and from this

TABLE 3

Leaf Samples
Mercury Residue Resulting from Single Spray July 11, 1949

Sample	Row	Time of Sampling	Total rain after spraying (inches)	Number of leaves	Hg. per leaf (Milli-micrograms)
23	2	7/11 as soon as dry		50 open	2.0
24	4	7/11 as soon as dry		50 open	18.0
25	6	7/11 as soon as dry		50 open	78.0
67	2	9/27	5.1	50 covered	1.0
68	4	9/27	5.1	50 covered	1.0
66	6	9/27	5.1	50 covered	1.0
70	2	9/27	5.1	50 open	1.0
71	4	9/27	5.1	50 open	1.0
69	6	9/27	5.1	50 open	1.0

Leaf and apple samples marked "covered" were covered with cellophane strips, lower end open from July 11 to harvest 9/27/49.
Leaf and apple samples marked "open" were uncovered from July 11 to harvest.
Row 2 received one spray of 1/800 "Puratized Agricultural Spray."
Row 4 received one spray of 1/1600 "Puratized Apple Spray."
Row 6 received one spray of 1/1000 "Tag."

TABLE 4

Mercury Residue After Single Spray July 11, 1949
Apple Samples

Sample	Row	Time of Sampling	Total rain after spraying (inches)	Weight of Apples (g.)	Hg. (P.P.B.)
15	2	7/11 before spray		750	0.06
16	4	7/11 beofre spray		700	0.35
26	2	7/11 as soon as dry		1680	6.00
27	4	7/11 as soon as dry		1500	1.90
28	6	7/11 as soon as dry		1710	1.40
31	2	7/22	1.32	1050	1.10
30	4	7/22	1.32	1010	0.80
29	6	7/22	1.32	730	1.20
73	2	9/27 harvest	5.10 open	810	1.25
77	4	9/27 harvest	5.10 open	680	0.70
78	6	9/27 harvest	5.10 open	830	0.60
74	2	9/27 harvest	5.10 covered	1000	0.80
76	4	9/27 harvest	5.10 covered	725	0.70
79	6	9/27 harvest	5.10 covered	990	0.50

Leaf and apple samples marked "covered" were covered with cellophane strips, lower end open from July 11 to harvest 9/27/49.
Leaf and apple samples marked "open" were uncovered from July 11 to harvest.

reading, together with the aliquot factor and the standard curve (Figure 1), the mercury in the sample was calculated.

$$\text{Hg content of sample (P.P.M.)} = \frac{\text{Micro-grams Hg x Aliquot factor}}{\text{Weight of sample grams}}$$

For samples suspected of containing copper as well as mercury, the aliquot was shaken with successive portions of the dye at pH 2.0 until complete extraction of both copper and mercury was evidenced by no further change in the color of the dye. The combined dye solutions were then transferred to another separatory funnel and 5ml. of 40% KBr, adjusted to pH 1.0 added to the separatory funnel containing the copper and mercury complexes. This was then shaken rapidly for one minute. The mercury was broken out of the dye phase and formed a new complex of K_2HgBr_4. The dye, now containing only the copper complex, was discarded and the aqueous phase containing the K_2HgBr_4 was adjusted to pH 6.0. At this pH the complex was transferred to the dye phase again and determined in the colorimeter as above. Since 10 ml. of dye were required for a reading in the Evelyn colorimeter, this volume of dye was added unless more than one extraction was necessary. This was easily ascertained by noting the color of the dye. If this had changed to a bright red, another portion of the dye was added. Additions of dye were carefully note to insure proper calculation of the final mercury content. Laug and Nelson [4] found that a thousand fold excess of copper over mercury could be quantitatively separated by this procedure.

Experimental Results

IN 1949, a series of plots was laid out at the Purdue Horticultural Orchard, Lafayette, Indiana, to estimate the harvest residue resulting from one, two or nine sprays applied at varying intervals. Samples were taken following sprays and at varying intervals up to harvest in order to get the effect of summer orchard temperatures and rain on the residue left on the fruit. In 1949, June temperatures ranged from 43 to 98, July—55 to 102, August—50 to 93 and September—33 to 84 degrees. The occurrence of and the amount of rain is indicated in the tables reporting the residue on the samples collected. In 1950, two harvest samples from each of two different orchards last sprayed in mid-summer were taken to compare with the low mercury residues found at harvest in 1949 (Table 6). In the 1949 comparison, three commercial mercurial products were used in the orchard spraying program. These were:

1. "Puratized Agricultural Spray" manufactured by Gallowhur Chemical Corporation, New York, New York. Recommended dilution is one pint to 100 gallons of water (1 to 800).
2. "Puratized Apple Spray," also manufactured by Gallowhur Chemical Corporation. Recommended dilution was ½ pint to 100 gallons of water (1 to 1600).
3. "Tag," manufactured by the California Spray Chemical Corp., Richmond, California. Recommended dilution was ½ pint to 100 gallons of water (1 to 1600).

Tables 1 and 2 show a comparison of the residue on leaf and apple samples taken before and after the fourth cover sprays at the Lafayette horticultural orchard in which "Puratized Agricultural Spray" and "Tag" sprays were used in 1949. Samples were taken throughout the season and at harvest from this orchard. Most of the samples came from this orchard.

To study the effect of rain on the reduction of residue, some leaf and apple samples were bagged in cellophane after the fourth spray on June 20, 1949, and left bagged until harvest. However, considerable moisture collected in the bags and the data were therefore subject to criticism (Tables 1 and 2). The procedure was then modified by tying cellophane strips around the fruit and leaf spurs, leaving the lower end open. This arrangement protected the fruit from rain and also prevented the accumulation of moisture (Tables 3 and 4).

(*Turn to Page* 123)

TABLE 5

Apple Samples

Mercury Residue Resulting from Single Spray August 23, 1949

Sample	Row	Time of Sampling	Total rain after spraying (inches)	Weight of Apples (g.)	Hg. (P.P.B.)
43	1	8/23 before spray		2600	0.0
44	1	8/23 as soon as dry		3200	4.4
45	3	8/23 as soon as dry		2620	5.0
72	1	9/27 harvest open	1.83	905	1.0
75	3	9/27 harvest open	1.83	975	0.7

Row 1 received 1 spray of "Tag" ⅔ pt. 100 gallons.
Row 3 received 1 spray of "Puratized Agricultural Spray" 1 1/2 pt. 100 gallons.

TABLE 6

Mercury Residue 1950 Samples

Sample	Time of Sampling	Weight of Apples (g.)	(P.P.B.)
161	*9/22 harvest	1680	0.58
162	*9/22 harvest	1550	0.43
163	**9/22 harvest	1120	0.14
164	**9/22 harvest	1180	0.13

*Sampled at Grimes Harvest, Bedford, Indiana. One spray applied 8/18/50.
**Sampled at Red Delicious Harvest, Lafayette Horticultural Orchard. One spray applied 7/2/50.

The Fertilizer Picture

past, present and future

UPON completion of a fertilizer season which brought many problems from the standpoint of obtaining raw materials, the question naturally arises, "What is the supply situation to be in the immediate future?" From the best available sources, I have tried to obtain some idea of the situation for the coming 1952-53 season.

Nitrogen

DURING the past season, some 1,375,000 tons of nitrogen in all forms were used for fertilizers. About 63 percent was in solid and 37 percent in liquid form. The trade is of course familiar with the fact that the U. S. Department of Agriculture has asked for an increase by 1955, of 900,000 tons of fertilizer nitrogen over that used in 1951. Of this new output, about 23 percent is requested to be in liquid form and 77 percent in solids. These percentages are in the right direction because our principal shortages of nitrogen now are in the solid forms. It should be pointed out also that we are already near our maximum use of liquid forms to ammoniate the superphosphate we now produce, and for the coming year there is little prospect for additional super to ammoniate.

That this additional 900,000 tons of nitrogen will be produced by 1955 seems assured, since certificates of necessity have already been issued for the construction of at least 12 large new ammonia plants and a like number of smaller new plants or additions to present plants with total capacities to equal this figure. Of course much of this authorized new capacity will not be in operation in time to furnish products for the 1952-53 season. However, Morgantown, one of the largest of the existing plants, has been reactivated and is now in production, and at least one of the plants which proposed to increase its capacity has those additional facilities already in operation. All the indications are that there will be at least 1,500,000 tons of N available for agriculture for 1952-53.

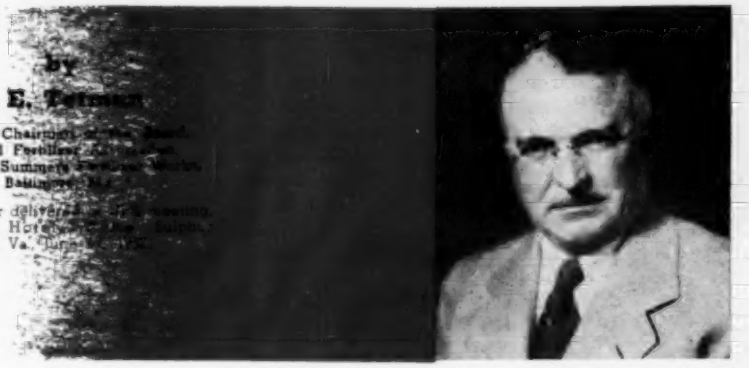
Our big problem will be, can we use it in the forms in which it can be obtained? Solid forms are short—particularly sulfate of ammonia. There is much talk of the large tonnages of 10-10-10 or 12-12-12 that will be called for in the future. There is a distinct limit to the amount of liquid ammonia, solutions, nitrates and urea that can be used in such grades and keep satisfactory mechanical condition.

Until we have greater quantities of sulfate of ammonia or find some new methods of formulating, it may well be that a large percentage of our nitrogen for row crops and small grains will have to be applied as top or side dressing. The manufacturing facilities for the production of byproduct and synthetic sulfate of ammonia are no doubt adequate to increase production materially and additional capacity could easily be constructed, but as long as sulfuric acid remains in such short supply we are not going to be able to obtain the quantities of sulfate of ammonia that are needed to enable us to fulfill the goals set by the U. S. Department of Agriculture.

Superphosphate

ALTHOUGH we had a little more available phosphoric acid for use in the 1951-52 season than had been anticipated, due in part to reduction in inventories, production in each of the last few months has been lower than in the corresponding month a year ago. This loss of production is due to the curtailment in the amount of sulfur available for agricultural use. The USDA report recently issued states that for 1951-52 there would be a deficit of 650,000 tons of sulfur in the sulfur requirements of agriculture. While the report expects there will be some 465,000 more tons of sulfur available for agriculture for the year 1954-55, than for the year just ending, it also anticipates sufficient increased demand by that time to make a shortage of sulfur for agriculture of some 925,000 tons.

In other words, much of our increased needs for available phosphoric acid in the future will have to be obtained in forms other than superphosphate as shall be discussed later. For the coming 1952-53 season there seems little chance of having more superphosphate than we had this year and perhaps slightly less. We do have in prospect some three or four additional concentrated superphosphate plants working in cooperation with the



by

J. E. Pe[illegible]

Retiring Chairman of the Board,
National Fertilizer [illegible]
President, Summers Fertilizer [illegible],
Baltimore, Md.

(From paper delivered at [illegible] meeting,
Greenbrier Hotel, [illegible],
Springs, W. Va., [illegible])

Atomic Energy Commission, some of which are now building. But since they will have to operate on sulfuric acid, which is limited, and since a ton of sulfuric acid will produce less available phosphoric acid in the form of concentrated superphosphate than it will as normal superphosphate, such plants will decrease rather than increase our overall supply. If it should come to pass that the use of sulfuric acid by defense industries should slow down, more of it can be obtained for superphosphate production.

Potash

OUR potash picture is better. The five older companies are all producing at top capacity, slightly more than last year. One new operator has recently started producing in the Carlsbad area and one more mine in the same area is expected to be able to begin shipments in November of this year. Imports also are expected to be somewhat higher than the 325,000 tons of K_2O imported in 1951. It has been reported that a very large new deposit of potash has recently been located by one of our large companies not presently in the potash business. Development of this deposit is in the planning stage. A recent report of the USDA indicates 1,515,000 tons of potash (K_2O) were available for use in 1951-52. Their survey indicates that domestic production for use in 1954-55 will have increased sufficiently to produce the 2,185,000 tons of K_2O set as a goal for use in that year, assuming imports the same as this year. Definite official estimates for 1952-53 are not yet available, but it appears possible that capacity for enough tons of new K_2O production will by then be in operation to furnish some 15 percent more potash than was used this past year

So—our raw material position for the coming year is, barring the unforeseen, considerably better and we hope will leave us with fewer headaches than the past year.

I should now like to discuss the *was*, the *is*, and the *will be* of the fertilizer industry, now just over a hundred years old. During at least two-thirds of that time our good agricultural land was capable of growing, with its native fertility, all of the crops necessary to feed the population. As the earlier cultivated soils of the eastern part of our country began to lose their fertility through the annual removal of crops and produced less and less each year, it was only necessary to begin cultivation of additional virgin acres farther west.

The total land area of continental United States is just a little under three million square miles or 1,920,000,000 acres. Of this total, only about 350,000,000 acres are growing cultivated crops, and this acreage has remained practically constant for the past thirty years. All our good agricultural land is in use and long has been. At the same time we have been living in a land of plenty.

Our people first became really conscious nationally of the food problem during World War I when they heard of Belgian relief and when meatless days were imposed. After the smoke of that war cleared away in 1920, we had, according to the U. S. Department of Agriculture, 3¼ acres of cultivated crops for each person in the country. But our population was increased by several thousand persons every day. By 1940 there were only 2½acres of cultivated crops per person and only 2¼ acres by 150. If present population trends of six to seven thousand additional people every day continue, there will be in 1960 only 2 acres. At the present acre rate of crop production, by 1975 it would take a hundred million more acres of good land to grow the crops needed to feed the thirty-eight million additional poulation expected by that time. The problem begins to acquire a truly serious aspect—there is no more good land.

When our industry first started, there was no overall national economic phase to the food problem. There was enough to go around and millions of acres of uncultivated arable land. For some sixty-five years fertilizer was purchased by the individual farmer as an investment to increase his production and swell his own profits, with no thought of national needs. During World War I, as a nation, we became fertilizer conscious as well as food conscious. When the naval blockade cut off all imports of potash from Europe, then the only source of supply, and when most of

our imported nitrate of soda was converted to explosives it became clearly apparent that fertilizers were a necessity for sufficient food production.

The twenty year period between World War I and World War II was one of readjustment, depression and recovery, and our industry was hard pressed to remain in operation. When World War II opened up, one of the first principles developed was the importance of the food supply and the nation's slogan became "Food will win the war." Although some sub-marginal acres were put into cultivation, it was generally conceded that the mainstay for additional food, feed and fiber crops was the use of additional amounts of fertilizer. Our industry was challenged to meet the patriotic slogan by an all-out effort to increase plant food production. We met that challenge and by the end of the war, in spite of a scarcity of many fertilizer raw materials and in the face of a shortage of construction and maintenance supplies, we were producing more than double our prewar fertilizer consumption—from a little over seven million tons to nearly fifteen million. At the same time, the price index of fertilizers was the lowest of any commodity the farmer had to buy.

Since the end of World War II our output has continued to increase each year, reaching about 19,000,000 tons in 1951. This present year, faced by the governmental control of sulfur, we find ourselves unable to obtain more than 90 percent of the amount of that material that we used last year. Sulfur is essential for sulfuric acid production with which to make superphosphate. No permanent solution of the sulfur shortage appears for the immediate future. The demand for available phosphoric acid already far exceeds the supply.

In the face of this situation, the United States Department of Agriculture has, as a result of a nationwide survey, estimated the amounts of the various plant nutrients that will be needed in 1955—only three years hence. According to these figures, we will need then 2,185,000 tons of Nitrogen (N), 3,485,000 tons of available phosphoric acid (P_2O_5),and 2,185,000 tons of potash (K_2O). Roughly this is 118 percent more nitrogen, 80 percent more P_2O_5, and 104 percent more K_2O than we used in 1950. The majority of the expansion has yet to take place.

Our industry is challenged to meet these needs. If we fail to do so, there is always the threat faced in previous years, though quiescent in recent years because of our industry's achievements, of additional government production. In my opinion, we can and will meet the challenge with the same spirit and effect of private enterprise, that has kept our industry serving agriculture so well through the years. It will not be an easy accomplishment. It will take the foresight and courage of all to meet the problems involved.

Progress Necessary

THERE must be monumental changes in our industry over the next few years if we are to meet the challenge successfully. For a hundred years we have pursued one production path. We have made superphosphate by the same process during that time with only minor chemical perfections and in some cases important mechanical improvements. We have compounded, with this basic commodity, various nitrogen and potash carriers to produce our commercial product of mixed fertilizers. True, from time to time we have added new nitrogen compounds and learned how to utilize others hitherto considered impractical. We have by better refining methods produced higher analysis potash materials. We have perfected production of concentrated superphosphate and various ammonium phosphate materials. In the main, all these new compounds are more concentrated than the old and they have enabled us to furnish the farmer higher analysis mixtures. The average plant food content of fertilizers today is about 50 percent higher than it was twenty-five years ago. This is a laudable achievement, as is the fact that we are able to place our products in the hands of the farmer at a price which enables him to produce five or more dollars in extra crop value for every dollar's worth of fertilizer used.

Yes, we believe we have served American agriculture well. The U. S. Department of Agriculture has gone on record to the effect that at least 25 percent of our present crop production is directly caused by the use of fertilizers. This means that if there were no fertilizers used, it would take close to a hundred million more good acres to grow the crops we now produce.

Our industry is being criticized by some government officials as having lagged in our efforts to meet the scarcity of available phosphoric acid. The nitrogen and potash supply problem, when you include import probabilities with domestic production outlook, seems well in hand. Not so the immediate phosphate problem. It seems apparent that we must look to other sources than superphosphate because of the current shortage of sulfur and the ever-dwindling reserve supply. It no doubt is true that sufficient sulfur can be produced in time from sources other than native brimstone but at a cost that may and likely will be prohibitive. We must develop other processes than the old superphosphate process to produce available phosphoric acid. There are many such processes known and some of them are in operation in other countries. Some resort to acidulation by acids other than sulfuric or mixed with sulfuric. Others rely on temperature reactions with or without various reagents. Too little is known in our industry and in our country about the economics of these processes. Too little has been done to determine their effectiveness under our conditions. The dwindling sulfur reserves have been a spectre in the picture for years. So perhaps there is some justification for criticism of our industry's lack of research on phosphates. However, despite research, with the low cost and availability of sulfuric acid, no other phosphate fertilizer could be produced as cheaply as normal superphosphate. I am happy to say that the present situation of sulfur control and resulting available

(*Turn to Page 117*)

Advisory Committee Meets, Makes Plans for Chicago

Fertilizer Safety Conference

GENERAL plans for the big industry-wide meeting of the fertilizer section of the National Safety Council, scheduled to be held at the Sheraton hotel, Chicago, October 22-23, were made by the Industry Advisory Committee at the Greenbrier hotel, White Sulphur Springs, W. Va., June 19. The Committee meeting, timed to catch many of its members at either the National Fertilizer Association meeting or the American Plant Food Council convention, had a large percentage of its members present.

Plans were made to publicize widely the dates of the Chicago meeting, and detailed plans for speakers and discussion topics were drawn up.

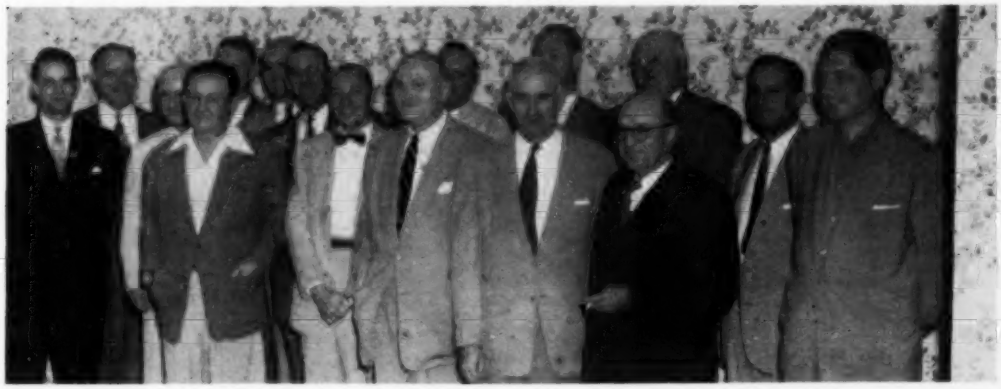
The discussion touched on the advisability of including matters of public health within the committee's work, but it was informally decided that such matters, for the time being at least, should be excluded. Emphasis should be placed on safety in plant operation . . . which was regarded by committee members to be sufficiently difficult to require most of the time and energy of the group.

A lengthy discussion on the advisability of mixing fertilizers with insecticides was finally resolved in a decision to let the matter stand as is at the present. It was brought out that since the Delaney Committee has only recently given the fertilizer industry a clean bill of health, it would be unwise to move too fast in including pesticides with fertilizer mixtures until more is known about the possible toxic hazards.

Chairman of the meeting of June 19 was Jack S. Fields, Phillips Chemical Co., Bartlesville, Okla., Gen. Chm. of the fertilizer safety group. Secretary was Vernon S. Gornto, Smith-Douglass Co., Norfolk, Va.

Others present at the meeting included: Parker Kemp, Liberty Mutual Insurance Co., Chicago, Ill.; Russell Coleman, president, National Fertilizer Association, Washington, D.C.; Charles W. Best, Robertson Chemical Corp., Norfolk, Va.; Roger L. Hugg, International Minerals & Chemical Corp., Chicago; W. C. Richardson, Southern States Cooperative, Richmond, Va.; U. C. Ellis, Swift & Co., Chicago; George L. Seth, Mine Safety Appliances Co., Pittsburgh, Pa.; F. A. VanAtta, National Safety Council, Chicago; F. Wayne High, Baugh Chemical Co., Baltimore, Md.; A. B. Pettit, Davison Chemical Corp., Baltimore, Md.; Richard E. Bennett, Farm Fertilizers, Inc., S. Omaha, Nebr.; Ralph E. Fraser, Summers Fertilizer Co., Baltimore; Tom Clarke, G.L.F. Soil-Building Service, Ithaca, New York; M. F. Wharton, Arizona Fertilizers, Inc., Phoenix, Ariz.; and Walter W. Lehle, Mathieson Chemical Corp.

Full details of the coming October meeting will be released at a later date, Mr. Fields said.



Fertilizer Safety Advisory Committee gathered at Greenbrier on June 19. Group made plans for big meeting in Chicago, October 22-23.

The Farmer and Congress

NOTWITHSTANDING the great progress we have made and the degree of prosperity we have achieved, the American farmer today is "*the low man on the totem pole.*" We must continue our efforts in behalf of the farmers of this nation, to the end that the producers of the food, fiber and timber essential to the welfare of our people may receive a fairer share of the national income. Since the livelihood of the fertilizer industry is so closely associated with the welfare of agriculture, the many parts and parcels of the farm program now in operation—a program which has worked so well and successfully in recent years, should be familiar to all.

Therefore, a detailed discussion of the functions of the many agencies of the government which are now working in behalf of our farmers, is not necessary, nor shall I attempt to discus all of the many things which have been done in recent years in behalf of the farm people of America. It should be asserted, however, that during the last twenty years, more legislation beneficial to farmers has been enacted into law than during the entire life of the nation theretofore.

Let us look behind all the many programs which have been provided to the more fundamental question—*What are we trying to achieve through the operation of the federal farm program?* It seems to me that the answer is very simple—we are trying to bring about a degree of stability on the farms and ranches of our nation. We are trying to encourage farmers to produce abundantly and yet intelligently, to the end that the people of our nation might have all of the things that they need and want and expect at the hands of the farmer.

The nation has the right to expect certain things of our farmers, and our farmers in turn a right to expect certain things of their government. Farmers have certain responsibilities to the people of the nation, and the government of the nation has certain corresponding responsibilities to those who till the soil.

The people of the nation expect the farmers of the nation:

(1) to produce abundantly all of the food, fiber and timber that the consuming public needs and wants;

(2) farmers must produce continuously, year in and year out, if this nation is to prosper;

(3) farmers must protect and preserve the fertile top soil of our farm lands—the richest resource of our nation.

If the nation has the right to expect these things of farmers, certainly our farmers have the right to expect the government to meet all of its corresponding obligations. These corresponding responsibilities on the part of all of the people of this great nation to our farmers, are:

(1) The government, acting for all the people, must provide through private industry all of the necessary tools to produce the desired abundance and must by law provide that farmers shall not be penalized or destroyed by the very abundance which they are urged and called upon to produce.

(2) If farmers are to adjust their production to meet the changing desires of consumers and the changing needs of the nation, there is a responsibilty on the part of the nation to make it possible for farmers to shift their production to meet these needs and to protect them against the risk involved in meeting the requirements of such a program.

(3) If we as a nation, as consumers, expect continuous production from our farmers in times of adversity as well as in times of prosperity, in times of low prices as well as high, we have the responsibility to see that the farmer's capital investment is protected against arbitrary economic factors and that he does not lose that capital investment while producing at a loss the things that we as a nation need.

(4) We, as a nation, must aid the farmer in the proper care of our soil resources not only for the present, but for future generations.

All the people of this nation, producers and consumers alike, have a community of interests in the abundant production in all of the things that come from the fields and ranches of America. Our present farm program is based upon abundant production. There is only one way to improve the standard of living for the

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Addres by Representative Harold D. Cooley (D-N. C.) Chairman of the House Committee on Agriculture, before the Seventh Annual Convention of the American Plant Food Council, The Homestead, Hot Springs, Va., on June 21, 1952.

by
Hon. Harold D. Cooley
Chairman, House Committee
on Agriculture,
Washington, D. C.

people of our nation, and that is to produce more and more of the things that the people need and want. Only by more abundant production can our people have more and better food, more and better clothes, houses, automobiles, radios, and all the other things that go to make for a better life and a higher standard of living.

Much vs. Too Much

THE Congress is interested in providing the working machinery which will enable our people to achieve a better standard of living. Congress is not interested in a program of scarcity, nor is it interested in bringing about the production of a surplus beneath which the man on the farm may be buried while the rest of our people go in want.

Farmers have a right to expect the government to protect them against the disasters that can result from super-abundance in production, and that, Congress through the federal farm program, has tried to do. We have achieved great success, but the program even now is far from perfect. No other group in our economy is subject to the great uncertainties which are faced by farmers as they go forth in the spring to plant the products upon which their livelihoods depend. Weather, seasons, and insects, and all of the uncertain factors of nature over which mankind has no control, have a great and tremendous influence on the production of our fields. Even with the best planning, production varies and cannot be controlled accurately. We fix our goals as best we can, but there is always the possibility that production will vary by good or bad weather. If we achieve the goal of abundance, farmers may enjoy a degree of prosperity. If we achieve less than an abundant production, or a super-abundant production, we always come to grief. In this realm of uncertainty, dealing with all of the laws of nature, farmers must work out their welfare. In this uncertain environment the farmers of our nation are worthy of every consideration of our government and of all our people.

If farmers produce less than enough or more than enough, they must pay the penalty. Even the mere prospect of more than enough, may bring grief. Just last year the mere prospect of more than enough cotton sent the prices down 10 cents per pound. Production of only 5 percent more of a commodity than consumers want or are willing to buy, may destroy the market, demoralize prices, and result in losses to those who have toiled to harvest the abundance which the people do not want. Just one car load of lettuce or potatoes or oranges sitting in the New York market that nobody at the moment wants to buy, can mean a tragic loss to every grower of that commodity clear across the country.

Yes, the nation is entitled to abundant production at the hands of its farmers, but the government must assure those who till the soil that they will not be penalized by the abundance they have produced and, further, that they will be protected against the disastrous effects of an inadvertent, temporary or transitory super-abundance.

Protection for Farmers

THE government is not charged with the responsibility of protecting farmers against a constant and chronic over-production of any agricultural commodity. If farmers are to enjoy the protection of the government against over-abundance, they must be willing to plan their production intelligently to produce enough, and not too much, of what the nation needs and wants. They must be willing to accept some kind of orderly control of their production if that control is necessary to keep production at the desired level to meet all consumer demands. Producers who are unwilling to try to keep production in line with reasonable consumer demand, have no right to expect any sort of guarantees or assurances from the government.

The government even in times of great emergencies must provide ways and means for farmers to have modern tools and equipment, fertilizers, insecticides, defoliants, and other chemical aids and all the other things essential to the modern techniques of production. Without all of the things provided by the ingenuity of our generation, we cannot possibly maintain the high productivity which is essential to the welfare of our people.

"Chemicals Indispensable"

THERE has been a revolution in American agriculture in the past 20 years. Machinery, chemicals and fertilizers which a generation ago were mere curiosities and experiments, are today absolutely indispensable to agricultural production. This revolution in American agriculture has been prompted and sponsored by your own great government.

The members of the House Committee on Agriculture, and the members of Congress generally speaking, are aware of the great responsibilities mentioned above and they realize that we must at all times have a prosperous agriculture if the rest

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of the nation is to enjoy the blessings of prosperity. We have many subcommittees constantly at work on the problems of agriculture. Our subcommittee on fertilizer and farm machinery has been very active and beneficial not only to farmers but to consumers as well. Our committees have made the country realize that all these modern production aids and techniques are no longer curiosities and novelties, but they are essentials which farmers must have if they are to produce the finished products of agriculture for the consuming public and for our contribution to the welfare of the free world. For the first time in history, National Defense Production authorities have recognized agriculture as an essential defense industry and we are gratified in the thought that the nation now knows the essentially of agriculture and understands its needs for steel and other metals, chemicals and plant food, and other things essential to the production which is needed by our civilian as well as our military population. The people of the nation now know that when a farmer wants steel for tractors and farm machinery, or sulphur and nitrogen for fertilizer, or chemicals for insecticides, he is neither foolish nor selfish in his requests.

Of necessity, farmers must gear their production to the wants of consumers. The products of their soil and toil must be sold in the greatest free market in all the world. The price they receive for their products is precisely and exactly the value that the American consumer places upon them—not one cent more nor one cent less. It is essential, therefore, that farmers produce the things for which there will be an effective consumer demand. All of this requires intelligent planning on the part of the farmer and a frequent shift from crop to crop and from one agricultural commodity to another. The nation knows that farmers are expected to shift their production from one crop to another to meet consumer demands, and in this great undertaking the government owes a responsibility to the farmers in bringing all of this about.

Farmers need accurate information on what consumer demands will be next month, next year, and five years from now. Market reports, crop estimates, and price statistics are all part of the assistance which farmers have the right to expect from their government in meeting the ever-changing and diversified needs of the consuming public. These services have not yet attained their maximum degree of efficiency and usefulness to farmers. A special subcommittee of the House Committee on Agriculture has just completed a 4-month study of the crop reporting and estimating services of the Department of Agriculture. This report will soon be available.

In the Agricultural Marketing Act of 1946, Congress authorized a greatly expanded and much more useful *Outlook Service* to be provided for the information and guidance of farmers. The Committee on Agriculture which drafted and sponsored that historic farm legislation, contemplated that a greatly intensified outlook service would be provided for farmers on a market area basis, and would give them the best possible guidance as to what consumer demand was likely to be not only for major, basic commodities, but also for the many other commdities which are sold to a large extent on relatively local markets. Thus far, this type of outlook service has not been developed in anything like the manner contemplated by the committee at the time it drafted this legislation, but we have every reason to believe that it will be improved in the days ahead.

Unprecedented goals have been fixed for our farmers. American agriculture has been called upon to produce all the things we need at home and something more for our allies abroad. In this situation, farmers cannot be expected to carry the full responsibility alone. The government must assure the farmer, insofar as humanly possible, that in meeting these great goals the government will share the risks involved. If our government has made commitments to other nations and has called upon farmers to produce the things necessary to enable our government to meet those commitments, certainly the government should underwrite the transactions and not leave the farmer alone to carry the burden and to assume the risk.

Yes, our farmers are expected to produce in both fair weather and foul, and to feed the nation and to meet the nation's needs. Unlike industry, the farmer cannot control by the touch of the throttle the elements of production or the products of his fields. When industry is faced with heavy inventories industry can control its activity, but when crops are once planted they must come to harvest, either good or bad. No one expects industry to produce at a loss, and no one has a right to expect agriculture to continue to lose by its intensified efforts. The nation and the free world expect American agriculture to provide a steady flow of food and fiber, year in and year out, and the nation must protect the producers as they go forth to plant and to harvest.

In the early 1930's farmers actually produced food and fiber for consumers at a substantial loss. Most consumers do not realize it, but there have been years after years when they have bought their food and fiber at prices which did not even return the cost of production to farmers. We hope that there will never again be any such period as that which farmers went through in the early 1930's. The distress, the hardships, the heartaches, and the disappointments that farmers went through in those years should never be known to us again. When farmers were unable to obtain the cost of production, were unable to meet the fixed payments on their capital, the interest on their notes, and their other obligations, thousands of them saw their capital investment dissipated and devoured and all their earthly possessions taken away from them.

I know that it is not necessary for me to explain to you why our soil resources are important, or to

(Turn to Page 63)

RECOGNIZING THE GROWING DEMAND FOR AMMONIUM SULPHATE IN THE MIDWEST, AND TO BETTER SERVE THE NEEDS OF FERTILIZER MANUFACTURERS IN ITS NORMAL MARKETING AREA THROUGH A MORE INTIMATE CONTACT WITH THEM, INLAND STEEL COMPANY WILL SELL ITS OUTPUT OF AMMONIUM SULPHATE DIRECT TO MANUFACTURERS BEGINNING JULY 1, 1952.

INLAND

INLAND STEEL COMPANY
38 South Dearborn Street, Chicago 3, Illinois

The Listening Post

Control of Golden Nematode of Potato

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

THERE are several reasons why the following reports on the control of golden nematode of potatoes and tomatoes, *Heterodera rostochiensis*, is of special interest. The nematode is very destructive where it occurs. In the United States it is confined to Long Island, which is designated a quarantine area to prevent spread to other sections. A nematode recently discovered on tobacco roots in Connecticut seems to be indistinguishable morphologically from the potato golden nematode, but there is some doubt as to whether it is physiologically and pathologically identical; perhaps it is a different strain.

Quarantine regulations forbid importation from abroad of plant or other material containing the nematode. Some recent interceptions by inspectors of the U. S. Bureau of Entomology and Plant Quarantine demonstrate the necessity for quarantines, if we are to prevent undesirable agricultural hitchhikers like this one from invading in force. Four interceptions of the golden nematode have been made in potatoes from Peru since the first report from that country a very short time ago. Finding of the nematode in a shipment of potatoes from the Canary Islands to Puerto Rico is apparently the first record of occurrence in the Canary Islands. Another recent interception was in ship's ballast from Scotland.

The interception on lily-of-the-valley pips that prompted the control investigations described below is a good illustration of the watchfulness that is required to prevent such pests from slipping in. Lily-of-the-valley is not a host of the golden nematode; that is the nematode will not penetrate and grow in this plant. Nevertheless cysts of this nematode were found attached to roots of imported lily-of-the-valley pips that apparently had been grown in infested soil recently used for growing potatoes.

Investigations on treatments included two phases, that is efficiency of treatments in controlling the nematode, and tolerance of the plants to the various treatments. The report on the first part is given herewith; the second part will be the topic of a later "Listening Post."

Julius Feldmesser, George Fassuliotis, and F. J. Spruyt of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering state that in November 1949, European shipments of lily-of-the-valley (*Convallaria*) pips, with golden nematode cysts adherent to but not parasitic on the roots, were intercepted at the Port of New York by the Division of Foreign Plant Quarantine, U. S. Bureau of Entomology and Plant Quarantine, Hoboken, New Jersey. These pips were intended for shipment to growers in all parts of the country. To avoid the spread of the nematode throughout the country, a cooperative project was initiated to secure data for treatments that would prove lethal to the contents of the nematode cysts and at the same time be tolerated by the plant materials. Convallaria pips so treated might then be imported without danger. Treatments for the controls of the nematode were carried out by the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, at Hicksville, New York.

Exploratory treatments were made in four categories: chemical dips, vapor heat treatments, methyl bromide and hydrogen cyanide fumigation, and hot water dips. These treatments were investigated for their effects against cysts (i.e., dead *Heterodera rostochiensis* females containing viable, hatched or unhatched larvae). To secure a supply of cysts, infested soil was removed from the laboratory field at Hicksville, washed through a U. S. Standard no. 60 sieve and concentrated so that one gram of the resulting material contained approximately 1200 cysts mixed with organic chaff matter. One-gram lots of this material were enclosed in small nylon bags and treated as described herein.

After treatment, each lot of cysts was stored in a constant temperature chamber at 70° F., then divided into two parts and examined for viability at periods varying from three to four weeks after treatment. One half of each lot was examined under a binocular dissecting microscope and the number of cysts containing viable and non-viable larvae counted. A cyst was counted as having viable larvae if one or more larvae remained alive in it after treatment. When there was doubt as to viability, immotile larvae were stimulated in the region of the circumoesophageal nerve ring by stroking with the shaft of a fine needle or with a bamboo splinter; invariably, viable larvae showed some motility after this stimulation. The second half of each lot was placed in potato root leachings in order to stimulate hatching, and checked twice weekly for evidence that this had occurred.

Treatments

Chemical Dips:

CYSTS in bags were dipped, for five-minute periods at room temperatures, in water solutions of the following substances, the proportion of the chemical to water being as indicated: Semesan Junior, 1:500 parts; Botonone, 1 oz. per gallon and 2 oz. per gallon; Dowicide G, 1:1000

Announcing

DDT and Parathion in a new, dustless, easy-to-use, all-summer cover spray

253

NOW you can produce more clean fruit with simple, easy, one-product control of codling moth, red-banded leafroller, leafhoppers, European red mite, red spider mite, San Jose scale, Forbes scale, and similar pests.

Black Leaf 253 is big news for fruit growers! It simplifies summer spraying, by replacing other more complicated and more expensive cover spray programs with one highly-effective, low-cost product.

This superlative new spray material is Black Leaf *Tobacco Base* "impregnated" with 25% of DDT and 3% of Parathion by an exclusive process. Thus Black Leaf 253 is equipped to provide "double-barrel" control. During years of research and development, Black Leaf 253 topped all other cover spray programs tested, in TOTAL CLEAN FRUIT.

Dustless. There are no billowing clouds of dangerous dust, when you handle Black Leaf 253. Scientifically treated to eliminate dust, Black Leaf 253 is easy to use. As the tank is refilling, the desired quantity can be dumped into the water where the agitators disperse it quickly and uniformly.

Compatible. Black Leaf 253 is compatible with all the fungicides and other materials generally recommended in combination with DDT and Parathion, such as wettable sulphur, ferbam, etc.

Less residue. Black Leaf 253 provides excellent control with the least possible chemical residue and essentially no visible residue when the fruit is harvested.

Black Leaf 253 has been used very successfully on all important varieties of apples. When spraying McIntosh or Golden Delicious, susceptible to Parathion injury, follow recommendations of local authorities.

For additional information on Black Leaf 253 and other members of the famous Black Leaf family of pest control products, communicate with the nearest office below. Your inquiry will receive prompt attention.

How to Use Black Leaf 253

Start your summer spray program with Black Leaf 253 and continue to use it throughout the season, as often and as long as necessary. Each application should be thorough, especially if red-banded leafroller or similar pests are a problem.

Use 2½ pounds in 100 gallons of water and repeat at the cover spray intervals recommended by local authorities. Use 2 pounds, if the interval between sprays is shorter than usual or if infestation is unusually low. Use 3 pounds, if the interval between sprays is longer than usual, or if infestation is severe.

Make such specially-timed, supplemental applications as may be recommended in your area to control apple maggot, curculio, or red-banded leafroller.

Do not use Black Leaf 253 within 30 days of harvest. When sprays must be applied to protect early varieties just before or during harvest, use 2 to 3 pounds of Black Leaf 155 *(fixed nicotine)* which leaves no undesirable chemical residue.

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DEPENDABLE PEST CONTROL PRODUCTS SINCE 1885

and 1:2000 parts; Dowicide 7, 1:2000 parts; iodine, 1:5000, 1:10,000 and 1:100,000 parts; Parathion, 1:2000 and 1:3000 parts; E-605, 1:2000 parts; Ceresan NF, 1:500 parts; and Dowicide 2, 1:2000 parts.

In addition, two series of cysts washed, one being washed after exposure and one not, were dipped in Dowicide 2, 1:2000 and 1:4000 parts at 60° F., 70° F., and 90° F. for periods of 4, 5, and 6 minutes. Another series was dipped in 0.5% formalin at 85° F. and at 95° F. for 10 minutes. At the end of the designated exposure periods, the bagged cysts were removed from the solutions, allowed to dry in the bags without washing unless otherwise stated, and then stored.

Vapor Heat:

Cysts in bags were exposed to vapor heat for specified periods ranging from 30 minutes to one and one-half hours at various temperatures from 112° F. to 120° F.

Fumigation:

It has been demonstrated that cysts collected from soil in the winter are more resistant to treatment than those collected in the summer. It was therefore decided to use both types of cysts in the tests. The summer cysts had been collected from Long Island fields during the previous summer and thereafter maintained at 70° F.; the winter cysts had been collected from Long Island fields during December 1949 and thereafter maintained at 40° F. An average of 30 percent of both types of cysts was found to contain viable larvae.

Two fumigants were tested for efficacy against one-gram lots of cysts of both categories in fumigation chambers, the procedure being as follows: Material was placed in the fumigation chamber and air removed to form a partial vacuum where specified. Degree of vacuum is expressed as the percentage the normal atmospheric pressure was reduced in the chamber by the vacuum pump. Ten tests were made using hydrogen cyanide gas: 0.33 lb. per 1000 cubic feet for one hour, three replications at 50% vacuum and two replications at 90% vacuum; 0.5 lb. per 1000 cubic feet for one hour, two replications at 50% vacuum; and 1 lb. per 1000 cubic feet for one hour, two replications at 50% vacuum and one test at 90% vacuum. Twenty-two tests were run using methyl bromide: one at 1 lb. per 1000 cubic feet for 16 hours at normal atmospheric pressure; one at 2 lb. per 1000 cubic feet for four hours at 90% vacuum; one at 2 lb. per 1000 cubic feet for eight hours at normal atmospheric pressure; one at 3 lb. per 1000 cubic feet for four hours at 90% vacuum; two at 4 lb. per 1000 cubic feet for four hours at 50% vacuum; six at 4 lb. per 1000 cubic feet for four hours at 90% vacuum; eight at 4 lb. per 1000 cubic feet for four hours at normal atmospheric pressure; one at 5 lb. per 1000 cubic feet for four hours at 90% vacuum; and one at 11 lb. per 1000 cubic feet for eight hours at normal atmospheric pressure. In addition, a treatment that had been recommended as lethal was run in six replications: 4.33 lb. of methyl bromide per 100 cubic feet for two hours at normal atmospheric pressure. Fumigation chambers containing bagged cysts were exhausted of the fumigant at the end of designated exposure periods and the bags of cysts were stored to await examination.

Hot Water:

An exploratory series of treatments using a Fisher hot water bath equipped with a thermo-regulator was made in January 1950 and additional work on promising treatments was done during the period February-June 1950. The bagged cysts, both summer and winter types, were pre-wet to insure escape of air from them and were then immersed in hot water at the temperatures and for the times specified. The bags of cysts were placed in water at room temperature immediately after the exposure periods, allowed to dry, and then stored at 70° F. The following treatments were run: 110° F. for 45, 60, 90, 120 and 180 minutes; 112° F. for 45, 60, 90, 120 and 180 minutes; 114° F. for 45, 60, 90 and 120 minutes; 116° F. for 40, 45 and 55 minutes; 118° F. for 25, 30, and 40 minutes; 120° F. for 25 and 30 minutes; 125° F. for 10 minutes; and 130° F. for 5 minutes Later work included three replications at 116° F. for 45 minutes, three replications at 118° F. for 30 minutes, one test at 119° F. for 30 minutes, three replications at 120° F. for 25 minutes, and 14 replications at 120° F. for 30 minutes.

Chemical Dips:

The treatments with 0.5% formalin at both temperatures resulted in a total kill of larvae in the nematode cysts. Dowicide 2, 1:2000 parts, also killed all of the larvae, but was apparently adsorbed by materials placed in its solution, for the bags and cysts that were washed immediately after exposure to the chemical retained as heavy an odor of the chemical as the unwashed bags and cysts, indicating that the exposure time to this substance was actually much longer than that given above. Furthermore, one lot of cysts exposed to a solution that had been used, previously, to treat several bundles of lily-of-the-valley pips, showed a reduction in viability of only 98 percent. It is doubtful that the maintenance of a lethal concentration of Dowicide 2 in solution is possible without continuous checking and addition of the concentrate to the solution.

No other chemical dip tested killed all of the larvae in the cysts.

Vapor Heat:

One of the series of vapor heat treatments appeared to be lethal to the contents of the cysts, 115° F. for one hour, but this treatment was not rechecked because of the impracticability of using vapor heat in large scale operations.

Hydrogen cyanide gas, at the dosages and exposure periods tested, produced no significant reduction in viability of nematode cyst contents.

The treatment with 4.33 lb. of methyl bromide per 1000 cubic feet for two hours, was not efficient. It resulted in only a 50 percent reduction in viability of the summer cysts and a 16.7 percent reduction in viability of the winter cysts.

With other methyl bromide treatments, also, the reactions of larvae in winter cysts differed from those in summer cysts. Sixteen tests were made with 4 lb. per 1000 cubic feet

(*Turn to Page* 120)

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Status of Some Insect Pests During June

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

Cotton Insects

BY the latter part of June boll weevil infestations were becoming serious in some fields of all the major cotton counties of North Carolina. There was considerable variation from one locality to another but the infestations seemed to be more general and heavier than last year. In South Carolina, boll weevil infestation was also higher than at the same time last year. Examination in 90 fields of 18 counties revealed boll weevils in all fields with square infestation averaging 32 percent as compared to 19 percent in 1951. The boll weevil continued to be the number one damaging insect in the Lower Rio Grande of Texas where some farmers were using control measures. In the northern two-thirds of the state early poisoning considerably lowered the overwintered population of boll weevils. However, additional poisoning may be necessary in eastern and northeastern Texas. There does not appear to be any serious build-up of weevils in other states of the cotton belt and in some, the population is considerably below that of last season. Weather conditions in the next few weeks will very well decide the boll weevil picture. Should hot, dry weather continue in the area for a period of 10 days or two weeks it would materially reduce the possibility of any big build-ups.

The pink bollworm continues to give evidence of a serious potential problem. In a recent release by Mr. D. M. McEachern of the pink bollworm control project, it was pointed out that bloom inspections in the costal bend area of Texas this year showed a much heavier pink bollworm infestation than last year. During the 1951 season, a total of 2,231,924 blooms were examined in which 2,520 worms were found. Up to the time of Mr. McEachern's report 4,529 worms had been found in 497,116 blooms. Last year 1,113 fields were inspected and 435 found infested. This year, with bloom inspection less than half completed, 375 fields were found infested in a total of 517 inspected. In less than one-fourth of the number of blooms inspected nearly twice as many worms were found as last year.

The cotton leaf worm was reported much earlier in the United States this year than last. The first leaf worm of the season was taken from cotton near Bayview, Cameron County, Texas, June 3 as compared to July 17 in the same county last year. With one exception, May 11, 1950, this is the earliest date of the leafworm in Texas for the last 8 years and 1950 was the only one of those 8 years in which widespread infestations occurred.

The cotton fleahopper was on the increase in several of the cotton states during the last of June. Injury was reported from the Piedmont counties of North Carolina and migration of damaging numbers into many cotton fields of the southern half of Texas was reported. Arizona, Oklahoma and New Mexico also reported an increase in certain counties.

Vegetable Insects

IN late June, Mexican bean beetles were appearing in numbers in early planted beans in New York. These insects were causing serious injury to beans in the Faison and Wallace districts of North Carolina and the Nashville district of Tennessee. Control was also necessary in Monroe and Oktibbeha Counties, Mississippi. The onion maggot was causing considerable damage to onions in the southern part of Wisconsin and to onion seedlings and sets in the Hollandale and Minneapolis-St. Paul districts of Minnesota. The insect was also appearing in several fields of Cayuga County, New York with many eggs not hatched.

The pea weevil condition in the Palouse area of Washington and Oregon was considered potentially dangerous during late June. It appeared certain that weevil infestations there would be higher than in recent years. Cool, rainy weather had retarded weevil activity until it appeared that egg laying would coincide with most favorable period for the peas to become infested. In south-central Idaho, the weevils were moving into fields and laying eggs. The insects were abundant throughout most of the canning pea district of northern Utah.

Hornworms on tobacco were rather light in Georgia and South Carolina, but insecticides were being applied. In North Carolina, hornworms were very abundant and eggs were beginning to hatch in Maryland.

Fruit Insects

THE first apple maggot fly was observed June 17 in Middlesex County, Massachusetts. This date is unusually early for that area. Fruit aphids were increasing throughout Massachusetts in early June. The rosy apple aphid caused more damage in Rockland County, New York than was anticipated and was noticeable in Wayne County where aphid sprays were omitted. The apple aphid

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Horses or pigs . . . oats or corn . . . it's nature's design that makes each living thing on a farm grow every hour of every day. Because growth and nutrition go hand-in-hand, there is an unending demand for the rich plant-food elements in the soil, upon which every growing thing depends.

Nature cannot always replace these vital soil ingredients quickly or in great enough quantities. Therefore, fertilizers are used. Many of the most effective fertilizers contain Sunshine State Potash, a product of New Mexico. More than a mere soil nutrient, POTASH strengthens crops, helps them to resist disease and drought.

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(*Aphis pomi*) was increasing in Rockland and Orange Counties, New York, and in some orchards of southern Illinois. It was threatening to become severe in Ohio. Populations in southern Indiana were heavy enough soon to warrant protective measures.

The European red mite population reached the danger point in several central Missouri orchards by the middle of June. In general, good control had been maintained in the commercial orchards of southern Indiana but weather conditions were ideal for mite development. The mites were abundant in unsprayed orchards.

Cereal & Forage Insects

THE European corn borer infestation was generally light throughout the corn belt. In Ohio by late June population was practically 100 percent complete and egg deposition was under way throughout the State. Oviposition was well advanced in Indiana with the taller corn showing shot-hole injury. The heaviest infestation in Indiana was in the southeastern counties. Some tall corn, 54-58 inches, in the Columbus, Indiana area had 88 to 96 percent shot-hole injury. Egg laying was complete in the East St. Louis, Illinois area by June 21 and practically complete in the southwestern part of the State. It was expected that a few fields in western, southwestern and northern Illinois might warrant treatment by the latter part of June. By late June in the southern two-thirds of Minnesota pupation ranged from 65 to 88 percent and the emergences of moths from 7 to 33 percent.

•

Jap Beetle Larvae Control

DDT or chlordane mixed with the upper 3 inches of soil is authorized for the treatment of beds and plots in commercial nurseries that are quarantined because of the Japanese beetle (*Popillia japonica* Newm.) Applied to the surface, these toxicants are recommended also for the protection of turf from this insect.

A 4-year study was made of the effect of these toxicants applied in this manner on growth of grass, rye, soybeans, and corn. The green weights of the crops in the treated plots were compared with the weights in the untreated plots. It was found that, except for a retardation in the growth of rye with DDT the first year, the application of DDT up to 60 pounds per acre, or of chlordane up to 19 pounds per acre, had no detrimental effect on these crops. Since the roots of these plants penetrated below the treated layer of soil, this experiment should be considered as a study of the reactions of crops under this special condition rather than a general study of the phytotoxicity of DDT and chlordane to these crops.

—Summary of USDA bulletin E-839, June, 1952, "Effect of DDT and Chlordane Applied to Control Japanese Beetle Larvae on the Yield of Grass, Rye, Soybeans and Corn," by W. E. Fleming and W. M. Maines, Division of Fruit Insect Investigations.

•

Fertilizer Meeting In Idaho

The third annual regional fertilizer conference was to be held July 9-11, in Pocatello, Idaho. Among the papers to be presented at the meeting was a report by B. R. Bertramson, Washington State College, on "The Delaney Committee Looks at Fertilizers." Other papers included a study on phosphates by K. D. Jacob, U.S.D.A., Beltsville, Md.; soil moisture studies by J. L. Haddock, U.S.D.A. Logan, U.; and one on defluorination of phosphate rock by L. H. Banning, Albany, Oregon.

FARMER & CONGRESS

(*Continued from Page 55*)

discuss the things which we can do to preserve them. Farmers owe to the nation, to this generation, and to generations yet to come, the obligation not to misuse, to abuse or to waste the soil resources that are now temporarily in their custody and control. It should be the ambition and the accepted obligation of every farmer to improve, before passing on to the next user, the land that he now owns and controls. In this great undertaking the government must aid the farmer in maintaining, improving and preserving our soil fertility for the benefit of those who shall come after us.

Certainly the farmers of America believe in free enterprise. They hate and despise controls, hamstrings, and hobbles, but they are willing to accept the advice of their government in fixing production goals. American agriculture is the greatest example of free enterprise left in the free world today.

The farmers of America have in magnificent fashion met all of the demands which have been made upon them, and the farmers of America will continue to meet these great demands if the government and the people of our nation will bear their part of the responsibilities involved. This great government of our's has tried to meet its responsibilities and has provided the things essential to the welfare of the farmers of our nation, to the defense of our nation, and to the destiny of mankind. If the government has failed, it has not been on account of the lack of effort, the earnestness of a desire, but because of the complexities of the problems with which the government has been confronted.★★

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Boyce Thompson Tour

A tour of the Boyce Thompson Institute Test Farm, the herbicide, fungicide, Peet-Grady, and insecticide laboratories highlighted an "open house" at Boyce Thompson Institute, Yonkers, N. Y. on July 1st. The tour reviewed the work being done by Drs. S. E. A. McCallan and Miller, and illustrated the general means by which new agricultural chemicals are developed, the type of tests being conducted, screening methods for various chemicals, toxicity tests, etc.

A current series of studies being carried on at the Institute is concerned with the development of chemicals from coal, particularly insecticidal sprays and herbicides.

In a discussion preliminary to the tour, Dr. George L. McNew, Institute director, reviewed some of the work done in the development of 2,4-D and "CRAG Herbicide 1," while H. B. McClure, vice president of Carbide & Carbon Chem. Corp., fine chemicals, considered the cost of developing agricultural chemicals. Dr. R. H. Wellman, as host of the tour, supervised the day's activities.

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Celite can be used with equally effective results in your primary grinds. It aids in the grinding of both solid and semi-solid low melting point poisons, and helps make a much more potent dry dust concentrate.

It will certainly pay you to look into the use of Celite as an inexpensive means of improving your product and increasing your profits. For further information, write to Johns-Manville, Box 60, New York 16, New York.

Properties of CELITE

FINENESS: Approximately 100% through 325 mesh
DENSITY (Vibrated): 11 pounds per cubic foot
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DILUENTS AND GRINDING AIDS

Suppliers' Bulletins

"Presidential" Folder Out

Of timely interest in this election year, is a folder presenting data on U. S. presidential elections from 1860 to 1952. Not an advertising folder in the usual sense, it lists all of the states alphabetically, gives the number of electoral votes for each, and indicates how each state has used these votes. Write for a copy, Bemis Bro. Bag Co., St. Louis 2, Mo.

•

New Myers Catalog

A new catalog has just been issued by F. E. Myers & Bro. Co., Ashland, Ohio, illustrating and listing the complete Myers line of power sprayers and accessories. Featured particularly are the one-man operated concentrate sprayers which the makers state provide efficient control of insects and plant diseases at low cost.

This catalog, (PSC52) is available from the F. E. Myers & Bro. Co., Ashland, Ohio.

•

Information on Spreader

Hercules Steel Products Corp. has prepared literature describing its new spreader, guaranteed by its makers to distribute lime and fertilizer evenly in 20-foot swaths. The equipment is said to give accurate control from 200 pounds to 8,000 pounds per acre, and can handle all types of agricultural limes and fertilizers, dry or moist. Write for detailed information on the spreader, to Hercules Steel Products Corp., Dept. 504, Galion, Ohio.

•

Granulation Literature Out

Sturtevant Mill Co. has issued literature describing its granulation process for fertilizer plants. The company points out the advantages of granulation of fertilizer materials and offers the equipment to produce such. Hourly tonnages and certain granule sizes may be predetermined with the Sturtevant process, the company states.

Granular fertilizer can be kept in storage bins longer without setting up or lumping, Sturtevant points out. Granular material also does not "set" in the bag and permits shipment direct to users or distributors' warehouses for storage ahead of peak demand, it states. Complete information about the Sturtevant granulation process is available from the company, 123 Clayton Street, Boston 22, Mass.

•

Weed Killer Described

A booklet describing "Premerge," a dinitro pre-emergence weed killer, has been issued by Dow Chemical Co., Midland, Michigan. It describes fully, the use of the product in soybeans, lima beans, corn, potatoes, gladiolus, established alfalfa, strawberries, red kidney field beans, pea beans, and green and wax snap beans.

Complete information is given on preparation of soil, application, proper equipment, including suggestions for nozzle types and correct calibration. Write for the "Premerge" booklet, Agricultural Chemical Sales Dept., Dow Chemical Co., Midland, Mich.

•

Calcium Arsenate Booklet

A new booklet, "Kill All 3," has been issued by American Smelting and Refining Co. to describe the action of calcium arsenate for control of boll weevil, bollworm and leafworm. The booklet states that calcium arsenate "has proved itself the 'number one' cotton pest killer" and presents statistical data on toxicity, residual properties, etc. The booklet is available from the company, 120 Broadway, New York 5, N. Y.

•

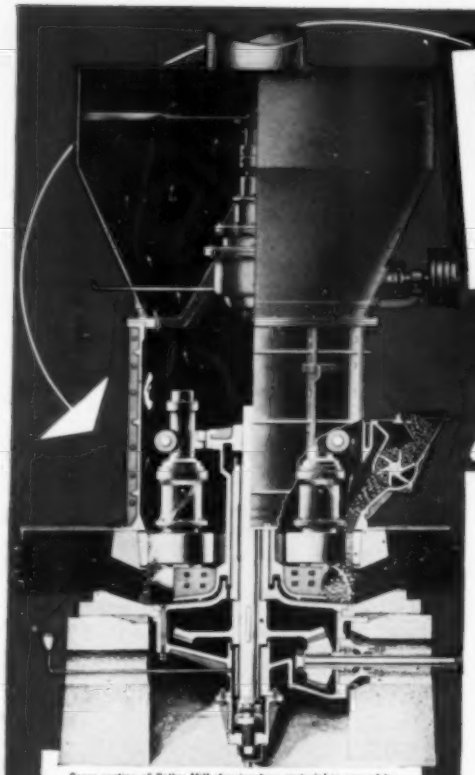
Emergency Shower Offered

A new portable emergency shower to provide protection in chemical plants has been developed by the Logan Emergency Showers, Inc., Glendale, Calif. A bulletin, designated as No. 30, has just been issued by the company describing the safety device. Several models are

(*Turn to Page* 127)

Self-Propelled, High Clearance Sprayer

The 1952 model Hahn "Hi-Boy" has been announced by Hahn, Inc., manufacturers of spray equipment of Evansville, Indiana. A self-propelled high clearance machine, it is designed exclusively for spraying. Among the advantages the manufacturer lists are the following: Light and rigid tubular frame, foolproof power unit, fully adjustable boom—from 24" to 96" in height—ground clearance 68", Hahn heavy-duty pump, 7½ h.p. Wisconsin air-cooled motor. Its uses include spraying of cotton insects, corn weed and corn insect control, truck crop spraying, plus other uses. Tank capacity is 100 gallons. Descriptive literature is available upon request.



Cross section of Roller Mill showing how material is ground by rolls rotating against bull ring, then air swept to separator which extracts fines and returns coarse material to mill for regrinding.

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High concentrations of DDT, BHC, toxaphene and other insecticides; rock phosphate, gypsum, limestone, dusting sulphur — whatever the material, if it has to be finely ground, there's a Williams Roller Mill to do it — faster, for stepped up production — more accurately and uniformly — and at far less cost.

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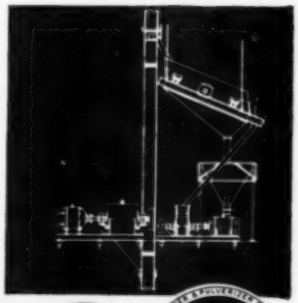

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Technical Briefs

How Insects Carry Virus

The methods of transmission of plant viruses by insects are not easily explained and there are a variety of relationships which are somewhat complex and difficult to interpret. The dissemination of viruses by aphids is not through simple external contamination. There is considerable evidence against such a relationship in the increased efficiency resulting from starvation, the significant variation in the ability of aphids to transmit different viruses, and the capacity of aphids to infect a number of plants when fed only briefly.

The transmission of two leafhopper viruses through the egg of their vectors and the serial passage from insect to insect of two other viruses, is strong evidence for multiplication and a biological relationship. Other leafhopper viruses such as curly top do not appear to multiply in their vectors.

The relationship between mandibulate insects and plant viruses is also not one of simple contamination of mouth parts, but appears to involve the process of regurgitation.

"Insect Vector-Plant Virus Relationship," by J. H. Freitag, in *The Plant Disease Reporter*, Supplement 211, April 15, 1952.

•

Weed Control in Beets

Many common weeds, with the exception of lamb's quarter and purslane in beets, can be controlled by the use of salt sprays. Some growers find a pre-emergence application of one of several materials worthwhile in conjunction with the post-emergence salt sprays.

Recommendation:

If a pre-emergence treatment is to be used, spray the soil with Stoddard Solvent (carrot spray) at the rate of 75 to 80 gallons per acre about a day before the beets are expected to come up. Heavier oils such as "Agronyl A" or "Esso 180" can be sprayed at the rate of 30 gallons per acre two days before beet emergence. Both of these materials will kill ragweed and cost less than Stoddard Solvent.

Apply the salt solution at the rate of 200 gallons an acre when the beets have developed at least from 3 to 5 true leaves. The solution is made by dissolving 200 pounds of stock salt in 100 gallons of water. For those who prefer to add nitrogen to the beet crop, 160 pounds of stock salt plus 120 pounds of nitrate of soda may be dissolved in 100 gallons of water. Sprayed beets may wilt for a day or two but soon recover. Since it is necessary to delay the salt spray until the beets have from 3 to 5 true leaves, weeds sometimes become too large for easy kill. In fields where this is likely to occur, it may be advisable to try a pre-emergence treatment.

The approximate cost for salt per acre of land covered is $6. With beet rows 24 inches apart, most growers spray only a 6-inch band over the rows. Then the cost for material would be approximately $1.50 an acre.

(Suggested for trial only).

Salt sprays have been ineffective where lamb's quarter (smooth leaved pigweed) and grasses are a problem. CMU at 3/8 pound per acre applied before the beets come up looked promising in 1951 trials. Endothal at 2 to 4 pounds gave excellent grass control and although more effective than salt was somewhat erratic in controlling lamb's quarter. *More information is needed on residues before these two materials can be recommended for use on food crops.*

——Alvin R. Hamson, Extension Specialist in Vegetable Crops, Cornell Univ., Ithaca, N.Y.

•

Liquid Fertilizer As Time Saver in Greenhouse

That both fertilizing and watering can be done in one operation has been demonstrated in greenhouses for a number of years, according to the recently-issued annual report of the Rutgers University (New Jersey) Agricultural Experiment Station. Quantities of nutrients applied were adjusted to correspond to those contained in a moderate fertilization for many bench and pot-plant crops. One quart of water per square foot of bench soil was adequate for a moderate watering. By combining the quantities of nutrients required to fertilize a square foot of bench soil with the volume of solution required to water it, the two, operations, usually separate, can be accomplished simultaneously. Such a combination is attained when 3 pounds of a 12% N-carrying fertilizer, such as a 12-12-12 or a 12-24-12, is dissolved in 100 gallons of water and applied to the soil at the rate of 1 quart per square foot.

During the summer of 1950, work in floriculture greenhouses demonstrated that growth of hydrangeas could be accelerated considerably by frequent applications of liquid fertilizer. It was also found, that, by simple modifications of the ingredients used in liquid fertilizers, color development in hydrangea flowers could be controlled positively.

Studies on the use of liquid fertilizers on greenhouse bench and bed crops are showing conclusively that frequent applications of these relatively dilute fertilizer solutions minimize the need for soil testing. Fluctuations in the nutrient content of greenhouse soils are thereby lessened.

Recent studies have demonstrated that nutrients applied with enough water to carry them to plant roots are absorbed rapidly and translocated through plants in a few minutes to regions where they are used for growth processes. This has been accurately determined by use of a radioactive phosphorus (P 32) obtained from the Atomic Energy Commission at Oak Ridge, Tennessee. Minute amounts of this material were added to liquid fertilizers to permit their rate of movement to be traced through plants. The radioactive phosphorus in this case was not added for any nutritive function.

Analyses with a Geiger counter showed that within 15 minutes

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ENDOTHAL—Endothal Defoliant S-4069 formulation—one of the hottest developments in the agricultural chemical field today—is now available in commercial quantities for use on field cotton in spray applications.

Endothal stimulates or induces the plants to defoliate themselves ahead of the time at which they would normally do so. Endothal Defoliant S-4069 is effective at relatively low per-acre rates, and will ordinarily produce its complete initial effect within a short time, so that rains occurring 5 to 6 hours after treatment ordinarily will not interfere with the defoliation response. It leaves no harmful trace element residue in the soil, and is effective under certain conditions of drought stress where other defoliants might fail.

Endothal has been widely tested as a cotton defoliant in various states and growing areas for the last three seasons. Endothal has been found effective by the Beltwide Cotton Defoliation Conference and is included in the regional recommendations of the National Cotton Council.

DE-FOL-ATE — an exclusive new Pennsalt development that gives the *maximum advantages* of chlorate-type cotton defoliation. Whether cotton is picked by hand or machine, DE-FOL-ATE makes plants easier to pick clean, and causes bolls to ripen uniformly. In turn, this means harvesting virtually the whole crop at one picking.

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*ENDOTHAL (disodium 3,6 endoxohexahydrophthalate) and DE-FOL-ATE are trade names of Pennsylvania Salt Manufacturing Company.

The uses of Endothal as a defoliant and herbicide are covered by one or more of the following U.S. Patents: 2,550,494; 2,576,080; 2,576,081; 2,576,083; other patents pending.

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after-liquid fertilizer was applied to the soil around chrysanthemum plants, the radioactive phosphorus could be detected in the tips of the stems nearly 2 feet above the ground. Within half an hour after application of liquid fertilizer to the soil in which tall, greenhouse rose plants were growing, radioactive phosphorus could be detected in flower buds 6 feet above the bed.

•

Ni Deters Citrus Growth

Trace amounts of soil elements, in quantities so minute that they can be determined only by spectrographic analysis can have a serious effect on the growth of citrus and possibly other fruit trees, according to Dr. A. P. Vanselow, associate chemist at the University of California Citrus Experiment Station. He reported that nickel in amounts of 25 ppm will reduce the growth of an orange seedling, and that aluminum, barium, lead, silver, strontium, and other elements have been found to have a similar effect.

•

Corn Weed Control

Virginia Polytechnic Institute recently issued a bulletin discussing the use of 2,4-D for chemical weed control in corn. The chemical weed control does not increase the yield of corn, extension specialists announced. Chemical weed control is recommended only with cultivation, unless conditions are impossible for cultivation. The extension men stated that one properly timed application of 2,4-D can effectively replace two cultivations, provided that a high percentage of weeds can be controlled effectively.

•

Determining S Content

A new method for determining sulfur and sulfate in amounts a low as one microgram, (approximately one thiry-millionth of an ounce), of sulfur in plants, soils,and irrigation water has been developed by C. W. Johnson and Hideo Nishita, University of California College of Agriculture. It is claimed that both sulfate sulfur and total sulfur can be determined in one to two hours with two to five percent accuracy. Particularly useful in studying sulfur deficiency in plants, the test can be run on small amounts of plant material.

In the test, the sample containing sulfate is mixed with hydriodic acid, formic acid, and red phosphorus at 115° C. Hydrogen sulfide is given off and determined spectrophotometrically as methylene blue. The presence of the organic sulfur compounds, cystine, cystein, glutathione, methionine, and taurine, does not interfere with the sulfur test. Total sulfur can be determined after the sample is ashed.

The sulfur test was specifically designed for studies of plant analysis for fertilizer needs. Already results are beginning to show a clearer picture of sulfur fertilization on several crop plants. But the necessity of testing dozens of crop plants on the more than 100 different kinds of soils in California makes this a long-range project. At the present stage of research, no definite recommendations can yet be made.

This method is not restricted to plant science research. It can also be applied to studies of sulfur metabolism in animal biochemistry and physiology.

—Summary of paper by Johnson and Nashita, *Analytical Chemistry*, 24: 736-741 (1952).

•

Borax in Fertilizer

The recent emphasis on increasing the acreage of permanent pastures does not mean that less alfalfa hay will be needed in the grassland-livestock program since agricultural leaders agree that more alfalfa hay will be needed along with increased livestock production.

It is quite likely that lack of adequate plant food, especially of potash and borax, has contributed to the recently reported poor crops of alfalfa and to the resulting loss of alfalfa acreage. Furthermore it would appear that the time is ripe for launching an intensified program of better fertilization of alfalfa in Tennessee.

Just prior to World War II an extensive alfalfa test demonstration program conducted in a majority of counties in Tennessee revealed that borax was needed in addition to lime and phosphate-potash fertilizers for production and maintenance of high quality alfalfa. In state-wide tours in 1942 and 1943, the need for borax was generally accepted by agricultural workers, by fertilizer manufacturers and dealers, and by farmers.. The use of about $1.00 worth increased yields of alfalfa from ½ to 1 ton per acre worth $15 to $30 per acre. Accordingly borax has been generally recommended for alfalfa in the state.

Although some counties in the early 1940's probably used borax on 40 to 50 per cent of their alfalfa acreage, this proven and recommended practice has decreased to the point where at present perhaps less than 25 per cent of the alfalfa acreage receives an annual application of borax. It is discouraging to note also that in recent years alfalfa acreage has decreased from 171,000 acres in 1946-50 to 130,000 acres in 1951. At an estimated yield of 2½ tons per acre, this represents a loss of over 100,000 tons of alfalfa hay with a present value of about 4 million dollars.

"Importance of Borax in the Fertilization of Alfalfa in Tennessee," in *Boron-o-Gram*, March-April, 1952. Published by Pacific Coast Borax Co., New York.

•

Fertilizer Studied

The most significant result of studying the value of commercial fertilizers in Canada has been that almost every fertilizer combination employed has improved the production of both hay and grain crops. While different responses have been obtained from various materials, it is significant that those carrying substantial proportions of nitrogen have been generally found most beneficial.

Fertilizer tests in which grain crops have been used as the indicator have shown definitely the advantage of nitrogen. Materials containing this element have consistently produced the greatest increase and yields of these crops. When applied alone, nitrogen has a tendency to delay maturity and to stimulate excess leaf and stem growth and consequently it is not desirable to use it in this manner. Phosphorus, when applied as

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such, has generally failed to produce more than minor growth increases. When this element is applied with nitrogen in approximately equal quantities, the most desirable net result is obtained. Production increases are greatest and the tendency of the phosphorus to hasten maturity of grains also asserts itself over the tendency of nitrogen to delay maturity. Applications of potash singly have failed to show any growth improvement in the crop. There is some indication of beneficial results from this element when used along with nitrogen and phosphorus.

In addition to determining the kind of fertilizer to be used, the amount to use for the most economical returns is extremely important.

Progress Report, Dominion Experimental Substation, Smithers, British Columbia, Canada.

•

Beet Fertilizers Studied

Applications of 1,200 to 1,800 pounds to the acre of a 5-10-10 fertilizer or its equivalent gave profitable increases of Detroit Dark red beets in four years of testing at the New York experiment station at Geneva, the station reports. All plots in these tests also received 50 pounds of borax to the acre.

"Considering the value of the increase in yield and the cost of the fertilizer, our results indicate that at least 1,200 pounds to the acre of 5-10-10, or 750 pounds of its equivalent in 8-16-16, may be applied to beets with profit, and that up to 1,800 pounds of 5-10-10 is likely to be the most profitable rate of application," say Prof. Charles B. Sayre and Dr. M. T. Vittum, vegetable crops specialists at the station in summarizing their findings.

Comparing fertilizers of the same ratio of plant food elements but with four different compositions, there was no significant difference any year of the experiment in yield of beets due to different fertilizer ingredients.

It is concluded, therefore, that the use of a sufficient amount of a low-cost formulation will give the most economical return from fertilizer applications on beets grown in a good canning crop rotation.

BHC Protects Logs

Southern lumbermen are using benzene hexachloride to control insects attacking green hardwood and pine logs, in line with recent research findings of entomologists of the U. S. Department of Agriculture.

Use of BHC, the lumbermen find, provides them with a way of protecting felled logs which cannot be immediately processed, from insect tunnelling (and resultant infection with decay organisms) that cause the sale price of much high quality lumber to be graded down.

BHC not only prevents attacks of ambrosia beetles (pinhole borers), bark beetles, and wood borers—the major insects attacking green hardwood and pine logs—but also can be used to protect green lumber from damage by ambrosia beetles.

Under ideal conditions, logs would be processed as soon as the trees were felled and green lumber would be stacked so that it would dry and season quickly. However, for economic reasons, many lumbermen cut and store their logs during summer and process them in the winter. The logs often are stored where they are subject to insect damage.

•

Urea Spray for Crops

At the recent annual meeting of the National Agriculture Conference in Denver, Dr. L. W. Nelson, Colorado A & M College, Fort Collins, Colo., discussed spray application of nitrogen to crops. In preliminary trials in several states, he said spraying has increased the yield of winter wheat by about ten bushels an acre in dryland areas. Dr. Nelson pointed out that in year of limited moisture, fertilizer cannot be carried into the ground; however, through the use of the urea compound spray on crop foliage, the farmer can delay fertilizing until moisture conditions are suitable. He said that application of the sprays by air is effective because absorption through plant leaves is rapid.

•

Synergist Study Published

U.S.D.A. Bulletin E-837, "Preliminary Tests With Certain *m*-Nitrobenzamides for Synergistic Action in Allethrin Fly Sprays" has been issued recently. The authors are S. I. Gertler, W. A. Gersdorff and Norman Mitlin. A table is presented, showing the toxicity to house flies, of space sprays containing certain benzamides in mixtures with 0.5 mg. of allethrin per milliliter. Concentration was 20 mg. per ml. in nearly all the tests. The bulletin is available from the U.S.D.A., Washington, 25, D. C.

•

Cotton Insect Booklet

A new service bulletin entitled, "How to Control Cotton Insects with Sprays," has been prepared by the Pennsylvania Salt Manufacturing Co.'s Agricultural Chemical Department.

It lists in chart form, recommendations per acre for the use of the various insecticide products available to the cotton grower. The chart also includes formulations for use at various times of application, for example, the pre-square, pre-bloom, blooming and maturity periods.

Sprays, including BHC, DDT, and toxaphene, are listed in the bulletin and each is identified with the insects it controls. The information is so arranged as to guide the cotton grower in the control of injurious insects or combinations of insects at any time during the season.

•

Has Rodent Repellent Bag

Fulton Bag & Cotton Mills, Atlanta, Georgia have announced the development of a new rodent repellent-treated bag which they have named "Ratscat." This new formula can be used on either cotton goods or burlap.

Experiments with these new bags began in 1948, in cooperation with a large Louisiana rice farmers association, and results have been reported as satisfactory, during the past five years.

•

TCA For Pigeon Grass

The sodium salt of tri-chloracetic acid (TCA) is said to give good control of pigeon grass, according to a recent bulletin by the American Crystal Sugar Co., Chaska,

(*Turn to Page* 125)

Soluble plant-nutrient chemicals by Monsanto are being formulated into fertilizer solutions, providing direct feeding to plants of nitrogen, phosphorus and potassium without harm to leaf crops. Immediate solubility, when applied directly to plants, is a characteristic of solutions of Di Ammonium Phosphate, Mono Ammonium Phosphate, Mono Potassium Phosphate and Phosphoric Acid 75%. They also are available for dry applications.

Shipped in appropriate containers, these chemicals are being used by fertilizer manufacturers in processing specific formulations for soil dressing or direct-to-plant applications. Standard farm equipment is used for either spray or solid application. For information concerning this available supply of plant-nutrient chemicals, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700-B South Second Street, St. Louis 4, Mo.

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Deere Co. Plans Plant

The John Deere Company, Moline, Illinois, was to ask its stockholders on July 8 to approve plans for construction of a $20 million chemical plant near Chouteau, Oklahoma. The plan has already been approved by the company's board of directors.

When put into production in January, 1954, the plant is expected to have a daily capacity of 180 tons of ammonia, urea and urea ammonia solutions and will employ about 200 persons.

•

Field Day in Connecticut

August 20 is the date for the annual field day at the Connecticut Agricultural Experiment Station's Mt. Carmel farm, the station has announced. Demonstrations and exhibits will emphasize tobacco growing.

APFC MEETS

(*Turn to Page* 103

the current rate, "we will need the equivalent of an additional 115 million acres of cropland, assuming yields per acre continue at about 1950 levels."

"According to plans and best estimates I can get, it looks as if we would be short somewhere in the neighborhood of 70 million acres in 1975," he said.

"Our greatest opportunity for making up this deficit is in better use of the land we already have. This assumes greater efficiency in production on farms and improved distribution, utilization, and marketing after the products leave the farm. We have already made great strides in this direction. But we are not making them fast enough."

Dr. Shaw, in viewing ways and means to make up the deficit in land and to take care of a population now growing at the rate of "2½ million a year," said that "we have nowhere realized the full potential from fertilizer use."

"Recent experimental findings suggest hundreds of new opportunities for increasing crop yields in this country through greater and better use of fertilizer" he said, adding that "usually the opportunities are greatest when fertilizer is used in adequate quantities in combination with other improved practices."

Dr. Shaw said that agriculture faces a tremendous job in the next 25 years but added that he was convinced "the people of America will do it."

O. V. Wells, chief of the Bureau of Agricultural Economics, U. S. Department of Agriculture, told the convention that "we have an excellent chance of maintaining a prosperous agriculture provided we are willing to face up to some of the problems involved, including the one of maintaining farm returns at an adequate level."

"The need for increased attention to research and for a continuing educational effort is generally subscribed to, but the simple fact is that these two items are not in themselves enough to assure the continuous and rapid adoption of technological improvements among farmers and ranchers," he said. "Farmers are businessmen. They have no choice but to ask of each new development, 'Will it Pay?'

"It is no accident that one of our most rapid periods of technological improvement came during the early years of World War II at a time when prices received by farmers finally moved into a more reasonable position in relation to farm costs than was the case during the preceding 20 years. There are some technological improvements which farmers can and will adopt even under adverse economic conditions. But, if we are interested in continuing technological improvement, we must also be interested in the problem of maintaining a stable and at least reasonably prosperous agriculture within an expanding economic framework."

Mr. Wells said that "the successful maintenance of technological improvement on farms generally is going to depend upon a combination of many things, including certainly the use of increasing quantities of fertilizers, better seeds and animal strains and increased attention to grassland and conservation."

He stressed the importance of continued and expanded agricultural research and educational programs.

D. Howard Doane, chairman of the board of the Doane Agricultural Service, Inc., St. Louis, Mo., following Mr. Wells, said that "the new concept of making very heavy initial applications of fertilizers in order to lift the level of (farm) production, in contrast to applying only crop needs, is the most significant contribution to American agriculture that has occurred within the last fifty years."

Viewing some of the obstacles and opportunities for increased volumes of agricultural production, Mr. Doane said:

"If a decreasing agricultural population with a smaller voice in national affairs can still hold an equitable position in our economy, we will feed our future expanded population. Failing at this point, the picture may not be too bright."

Mr. Doane said that "there is a limit to the degree to which we may continue to decrease farm labor and increase production," adding that "farm labor shortage, as a bottleneck to expanded production, may not be too far away."

Referring to farm costs, he said that "many of our agricultural colleges have shown by recent reports that both the long time and short time trends of cash income and expenses are approaching the point of no margin."

"Farm prices are showing a marked tendency to move downward from peaks established during the last five years," Mr. Doane said, adding "I am well aware of the fact that some farmers tend to grow more to meet the problem of less price in order to meet fixed and cash costs, but his ability to repeat what he did after World War I is greatly reduced."

Referring to himself as "just an Indiana farmer," Hershel D. Newsom, Master of the National Grange, warned about the dangers involved in big government. "We must be vigilant and realize that while big government cannot swallow all of us

(*Continued from Page* 43)

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Bacitricin by the Research Division, S. B. Penick & Co. Published by S. B. Penick & Co., New York. 127 pages, 31 tables, 5½ x 8½ inches, cloth binding, price $4.00.

According to the writers all the literature to date on bacitricin usage throughout the world has been collected, organized and summarized in this book. The various chapters cover the properties, chemistry, history, pharmacology, clinical results, synergistic action, bacteriological aspects, dosage and formulations. Concluding chapters contain a summary, bibliography of 198 listings, and list of U. S. Patents.

• • •

Technical Cooperation with Underdeveloped Countries by P. C. Newman, J. E. Ullman, and R. S. Aries. Published by Chemonomics, Inc., New York. 98 pages, 6 x 9 inches, papercovered, price $5.00.

This text is an analysis of the possibilities of industrialization in economically underdeveloped countries, particularly, Latin America, Africa and Asia, and reviews some of the methods of industrialization used in the past. A bibliography of 52 items refers to articles appearing in *Business Week, Life, Chemical and Engineering News, N. Y. Times, Wall Street Journal* etc.

Although the text provides an interesting analysis, it is considerably overpriced, considering that it is paperboard, lithoprinted, and contains only 98 pages.

• • •

Transactions Illinois Horticultural Society for 1951 edited by Harvey B. Hartline. Published by Illinois State Horticultural Society. 352 pages, 5¾ x 8½ inches, cloth binding.

The annual report of the Illinois State Horticultural Society for the year 1951 is presented in this text, covering the proceedings of the state society, the southern society, northern society, membership list, and reports on various technical papers given at the meetings. Among the reports included in the text are: "Concentrate Spraying" by E. F. Herrbach, Standard Oil Co., of Indiana; "Fertilizing and Spraying Small Fruits" by A. S. Colby, Univ. of Ill.; "Insect Carryover for 1952," by S. C. Chandler, State Natural Hist. Survey, Carbondale, Ill.; and "Spray Residue Tolerances" by George C. Decker, Ill. Nat. Hist. Survey.

• • •

Diseases of Vegetable Crops by John C. Walker. Published by McGraw-Hill Publications, Inc., New York. 530 pages, 6 x 9 inches, cloth binding, price $7.50.

Known facts on the diseases of asparagus, beet, bean, carrot, parsnip, celery, parsley, cabbage, cauliflower, cucumber, muskmelon, watermelon, squash, pumpkin, lettuce, onion, garlic, leek, pea, pepper, eggplant, potato, rhubarb, sweet potato, spinach, and tomato, are compiled in this text, with reference to original research papers on the various crops.

The diseases of each vegetable are discussed with regard to symptoms, the casual agents, and cycle of development. The book is the outgrowth of a lithographed manual used in a course in vegetable diseases offered to graduate students at the University of Wisconsin. The text includes many photographs and drawings illustrating material under discussion.

• • •

Pathology in Forest Practice by D. V. Baxter. Published by John Wiley & Sons, New York. 602 pages, 6 x 9 inches, cloth binding, price $7.50.

This second edition of pathology in forest practice reviews the origin, nature, and causes of diseases in trees and forests throughout the United States, Canada, and Europe. It tells how to check, regulate, and control pests and diseases, and discusses the relation of site and cultural practices, and relation of fungi and other plant pests to disease. The book is resigned primarily for the student and timber grower, with prime concern to the conditions causing diseases.

•

Expands Lindane Output

Plans for the large-scale production of lindane, have been announced by Ethyl Corporation. A new plant being built by Ethyl, and scheduled for completion early next year, is expected to make lindane available for many crops heretofore limited to older insecticides as well as to open up broad new applications in effective pest control. According to the announcement, farmers will be assured of adequate supplies at economical cost of this insecticide.

In a companion move, Ethyl announced that greatly enlarged facilities are nearing completion for the production of BHC, from which lindane is derived. Ethyl's expanded facilities, it was pointed out, will make possible the availability of lindane for widespread use.

Lindane is reported to be effective against a wide range of insect pests, and can safely be used, under prescribed conditions, on livestock and food crops as well as on fiber and forage crops as a dust or a vapor, or as a spray or an aerosol.

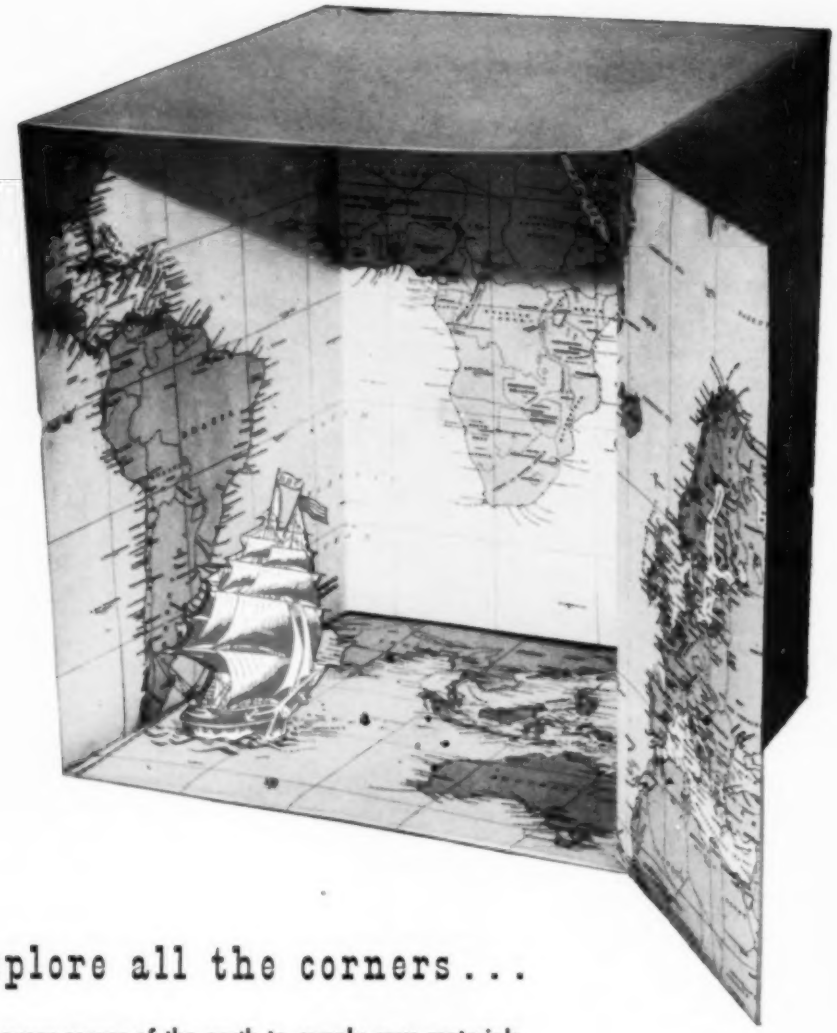
•

New Marathon Humectant

The chemical division of Marathon Corporation has announced a new type of humectant, now available. Designated as "Marathon 158-65," the material is composed principally of sodium lignosulfonate and modified carbohydrates from wood. The product is a dark-brown liquid with a molasses-like odor, containing 50% to 55% solids by weight and having a pH of 8.5 to 9.5.

Extensive tests indicate that "158-65" is comparable to glycerine in its ability to absorb and retain water. This product is not, however, a plasticizer.

Laboratory samples may be obtained direct from Marathon Corporation, Chemical Division, Rothschild, Wisconsin.



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Compatibility with Other Insecticides—Aldrin mixes readily and is compatible with other insecticides and fungicides. In fact, aldrin-DDT dusts and sprays are available for controlling all cotton insects including bollworm.

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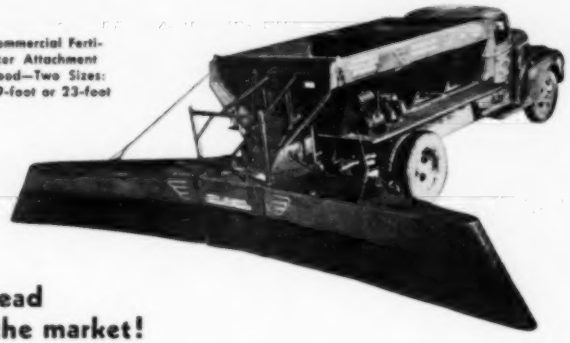
HERE'S THE ANSWER TO YOUR SPREADING PROBLEMS!

AGAIN! "The NEW LEADER" leads the field



Commercial Fertilizer Attachment Hood—Two Sizes: 19-foot or 23-foot

with its new "Motor-Driven Spreader" offering greater accuracy of spread with the most positive feed on the market!

SPECIAL ADVANTAGES — Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9′, 11′, 13′ and 15′. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7′-5″.

"The NEW LEADER" Self Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These units have four individual compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft. to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications, prices, etc. Fast delivery service sells fertilizer!

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IF YOUR BUSINESS IS DRY CHEMICALS, THESE PRACTICAL NEW CHECKLISTS CAN HELP YOU DO A BETTER PACKAGING JOB

WITH UNION'S new *Chemical Package Evaluator*, you can take a rough but usually accurate measure of your container's efficiency.

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IT WILL enable you to chart possible areas of improvement.

IT CAN make it easier for you to determine which are worth pursuing, and in what order.

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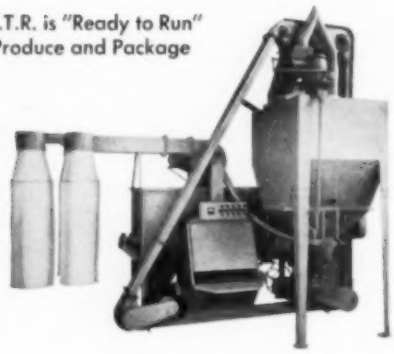
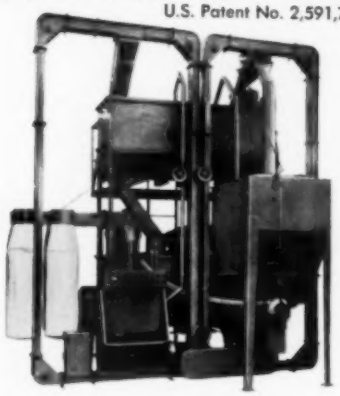
Poulsen R.T.R.* **UNI-BLENDER**

COMPOUNDING PLANTS

U.S. Patent No. 2,591,721

*R.T.R. is "Ready to Run" —Produce and Package

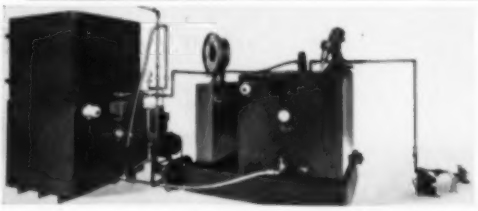




STANDARD TYPE R.T.R. Uni-Blender Compounding Plant is designed to mix and blend dust concentrates with diluents to produce and package ready to use, field strength insecticides of consistently uniform quality. The complete plant requires only 9'x12' of floor space and 13' of head room. Produces up to four 40 cu. ft. batches per hour *with only one operator.* Users report production of 29,000 pounds in 5 hours with two operators.

DUAL TYPE R.T.R. Uni-Blender Compounding Plant is designed to perform a dual function . . .(1) to formulate dust concentrates . . .(2) to produce field strength insecticides. Users claim this provides the most economical insecticide formulating equipment available. Handling 40 cu. ft. batches, the complete plant requires only 11'x11' of floor space and 16' of head room.

Both Standard and Dual types are available for immediate shipment.



R.T.R. Melting & Liquefying Equipment . . . R.T.R. Liquid Injection Equipment provide for liquefying and injection of specific technical grade toxicants required for the formulation of numerous concentrates and liquid sprays.

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The greatest lag . . . the weakest link in most packaging operations lies right *at the point of bagging.* VREDENBURG Bag Filling and Weighing Machines eliminate this bottleneck. Precision engineered, VREDENBURG Packaging Equipment is available in the proper model and capacity to suit your needs. Automatic or manual operation with broad calibration ranges afford a variety of *time-saving, cost-reducing, precise* uses from a single VREDENBURG model.

Investigate this VREDENBURG *profit-through-efficiency* formula. Full details and engineering assistance upon request. Write:

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—for use with valve-type multi-wall paper bags in handling . . .
- Abrasive and Non-Abrasive Free Flowing Materials
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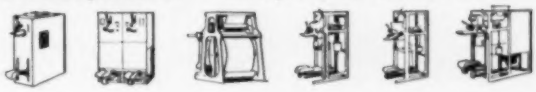
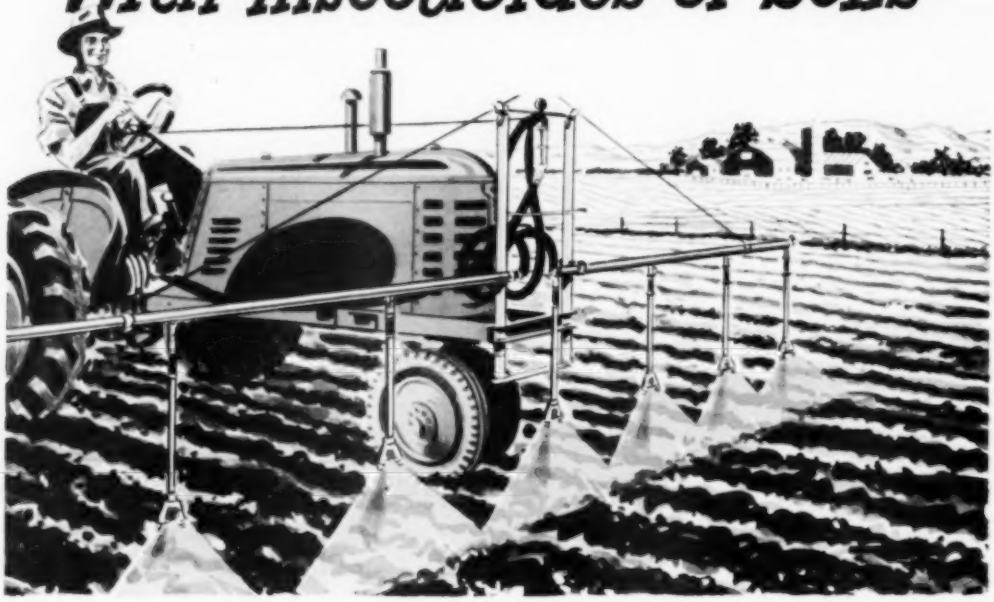


With Insecticides or Soils-



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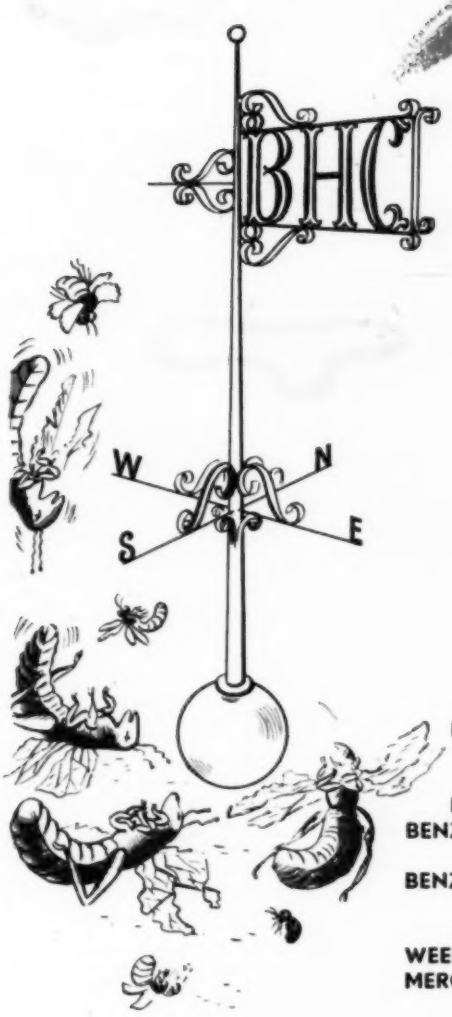

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Sequestrene* makes iron deficient crops green within four weeks and keeps them green for nine months or longer. Sequestrene presents the answer to a basic problem that has eluded man's ingenuity since he first dipped a hoe into the soil. That problem was to devise a practical method of inducing minerals into mineral deficient crops.

In actual field tests during the dormant season last winter Sequestrene made crops green in four to six weeks after application. In the spring these crops bloomed and produced new dark green growth three weeks earlier than untreated crops.

Sequestrene makes these results possible because this formulation enables crops to assimilate iron and therefore, corrects the disease known as iron chlorosis which causes yellowing of the leaves, defoliation and often death to the crop.

The initial tests have been performed on orange trees in Florida and involve a combination of Sequestrene and ferrous sulphate applied to the soil at the base of the trees. Spray applications to foliage also have demonstrated considerable promise.

Additional tests are being conducted for the treatment of such mineral deficiencies as copper, zinc, manganese, cobalt, magnesium and other essential trace metals.

*"Sequestrene" is the registered trademark of the product of Alrose Chemical Co., a Geigy Company.

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AS WE GO TO PRESS . . .

Delaney Committee Submits Report

says new legislation needed to protect public . . . minority report asks special status for pesticides.

THE Delaney Committee of the House of Representatives which has been investigating the use of chemicals in foods for the past two years, filed the third section of its four-part report June 30, 1952, summarizing its views by asking for legislation to protect the public against the hazards of toxic chemicals being introduced into the food supply. While the majority report failed to accord special status to pesticides, a minority report signed by Representative Walt Horan of Washington, indicated sharp disagreement with the conclusions of the majority report and denied that new legislation is either necessary or desirable.

The conclusions and recommendations of the majority report follow, together with Mr. Horan's minority report.

Conclusions & Recommendations

THE increasing use of chemical additives in the production, processing, preservation, and packaging of food has created a serious public-health problem. The evidence presented reveals that existing Federal laws do not provide complete protection to the public against the addition of chemicals which may be unsafe.

The strong recommendation of most of the witnesses before the committee was that no chemical should be permitted entry into the Nation's food supply until its safety for use has been demonstrated beyond a reasonable doubt. A provision in the law to that effect would benefit the food and chemical industries as well as the consuming public (93). Thus, the Director of the Bureau of Nutrition of the Department of Health of New York City told the committee:

> I would think that the industry, meaning the chemical industry or food industry in general, would welcome an outside authority, a nonprejudiced outside authority, to pass judgment upon the adequacy of safety tests that responsible members of industry itself use before they apply it to food. Certainly the chemists and scientists in these organizations can be put under tremendous pressure by management and many of them, I am sure, would welcome the final judgment of an outside source whether or not the addition of a new chemical may or may not constitute a health hazard (94).

In the committee's view, it is important that unnecessary obstacles to technological improvements in food production and processing not be created. It is believed that a "chemicals in food" amendment to the Federal Food, Drug, and Cosmetic Act would not hamper scientific improvement in this field, but rather would stimulate research, aid in technological improvement, and redound to the benefit of the food and chemical industries. It is interesting to observe, in this connection, that the New Drug Section has given new impetus to pharmaceutical research, and new strength to the ties between drug manufacturers and medical research facilities outside the industry (95).

It is clear that before a chemical is used in or on a food, or as a food, it should be subjected to acute and chronic toxicity testing to insure, as far as possible, that the public health will not be endangered. It is not possible to delineate, in any legislation, the specific methods or conditions of testing which should be performed on any chemical or class of chemicals. The specific type and duration of tests necessary to insure the protection of the public health will vary, depending on the composition of the chemical and the food involved, the breakdown products of the chemical and food when brought into contact or intermingled, the metabolic fate of the chemical, the quantity of the chemical or related chemicals already found in the diet, and many other factors. For this reason, your committee recommends that legislation to cope with the chemicals in food problem should not attempt to specify the type and manner of pretesting which should be conducted. Rather, the legislation should provide that evidence that the chemical is safe, and does not produce harmful chemical reactions, in the end food proucts, should be submitted to the Food and Drug Administration for clearance before the chemical is utilized. In any evaluation of the safety of any proposed chemical, the extent of the use of the chemical, or similar chemicals, in or on other foods, must be taken into consideration.

It was suggested by some witnesses that any legislation should treat insecticides differently from chemicals which are added to a food product after harvesting. It was contended by these witnesses that insecticides are not deliberately added to foods as are most other chemicals used for food purposes, and that the amount of the insecticide remaining on the food is not a constant one, as may be the situation in the case of other chemicals. However, insecticides, as well as other chemicals used in the production and processing of food products, are deliberately rather than accidentally utilized to perform a specific function with regard to the food in question. It is true that it is not customarily intended that insecticides appear on the end food products, but under certain conditions, particularly when proper precautions are not taken, they may so appear, in greater or smaller quantity. It is little comfort to the consumer that the manufacturer or applier did not intend that the insecticide remain on the food product, or at least not in such great quantity.

It is essential that, before a

1. Pesticides are necessary and must be used to produce food products and to protect the public health. Their use is from necessity and not by choice. These chemicals are present in varying and minute amounts.

2. Pesticides are already controlled by a legislative pattern consisting of Federal and State laws and regulations thereunder. These laws are the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, the Food, Drug, and Cosmetic Act of 1938, State laws in 39 States which in general follow the pattern of the Federal Act of 1947.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 requires that before a pesticide can be shipped in interstate commerce, it must be accepted for registration by the United States Department of Agriculture. Registration depends upon a showing that the product is both safe and efficacious for the purposes for which it is to be sold. Supporting data must be made available to the Department before registration is granted. Lack of data will result in a refusal to register. The type of supporting data depending upon the claims made consist of: entomological efficiency, pathological toxicity, residue at harvest, acute and chronic toxicity data, data showing effect on soils, data showing effect on taste and flavor. The solicitor for the Department of Agriculture has ruled that under the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, necessary data can be required before registration to show that the material is not only efficacious for the uses recommended but that it is safe when used as directed to the spray operator and to the consuming public.

The Food, Drug, and Cosmetic Act directs the Federal Security Administrator to limit, by regulation, the quantity of added poisonous and deleterious materials, including pesticides, which remain on any food "to such extent as he finds necessary for the protection of public health."

Standard procedure under existing laws before a product is registered is that the United State Department of Agriculture consults with the Food and Drug Administration and the United States Public Health Service. Both of these agencies are fully informed before a product can be sold in interstate commerce and the product is not accepted for registration if, in the opinion of any one of those agencies, it would be detrimental to the public health.

Under the State laws, similar controls and authority can be exercised at the State level.

Continued investigation of all phases of the product such as entomological efficiency, pathological toxicity, flavor and taste, effects on soil are continued by the industry, by the United States Department of Agriculture, Bureau of Entomology and Plant Quarantine, Bureau of Plant Industry, State land-grant colleges, the United States Public Health Service, Food and Drug Administration, and the Fish and Wildlife Service. The claims under which the material is registered are reviewed at regular intervals by the Department of Agriculture in the light of any new research data.

It is common practice in the fresh fruit and vegetable industry to wash products after harvest before shipment. This is because the Food and Drug Administration polices all shipments in interstate commerce. This applies to practically every fresh fruit and vegetable. Investment in washing machinery is one of the heaviest capital items in the fresh fruit and vegetable producing, packing, and shipping business. Use of such equipment insures the removal of spray residue. In addition, washing fresh fruits and vegetables in preparation for retail sale is growing practice. Thus, washing at both wholesale and retail levels affords protection against the presence of toxic residues. Authority now exists under Federal and State laws to bar from commerce any fresh fruit and vegetable product containing toxic residues which might be injurious to health.

In California, for example, under standards set by State law, 2,363 samples of produce were analyzed in 1949 and only 110 were found to contain spray residue in excess of State tolerances. Of course, it should be borne in mind that "tolerances" always err in favor of assurances to the consumer. In 1950, 2,842 samples were analyzed and 103 were found to contain overtolerance amounts; however, the averages and circumstances involved in these cases did not warrant filing criminal complaints. California imports some fruits and vegetables from other States and countries. Analyses of fruits from Oregon, Washington, and Idaho, and of vegetables from Florida, Texas, Arizona, and Mexico during 1950, did not reveal any deleterious residues in excess of legal tolerances.

The chemical industry, in developing a new pesticide, first screens thousands of chemicals to determine their biological efficiency. If one of the chemicals shows promise, research is started on its efficacy for pest control and toxicological research is immediately started to determine its practicability for use. The toxicological and biological research is started by the producing company. When promise is shown, work is expanded in cooperation with private research institutions, the United States Department of Agriculture, and land-grant colleges. The Food and Drug Administration and the United States Public Health Service are consulted. A recent survey of the industry shows that the cost of research before a product can be registered for sale ranges from $200,000 to $400,000.

The Food, Drug, and Cosmetic Act of 1938 has given the Food and Drug Administration full authority to protect the public from any residue hazards from the use of pesticides through the establishment of tolerances. Since 1938 only one official tolerance has been established, namely, on fluorine. In spite of the fact that tolerance hearings have been held on all of the principal pesticides at which 25,000 pages of technical data on residues and toxicity were presented, the residue tolerance hearings were closed on September 15, 1950, nearly 2 years ago, but no tolerances have yet been issued. Data upon every one of the pesticides referred to in section IV of the committee report were included. The control called for does not await new legislation but administrative action according to the existing law.

In the light of these facts, it seems unfair to me to state in part II that there are 276 chemicals being used in foods today, the safety of which has not been established.

This point is again referred to in part VI of the committee report as a basis for new legislation. I feel that the public is entitled to the exact status of the situation.

If any of these are pesticides, why have the regulations provided for in existing law not been forthcoming in this period of time? As not few (as indicated on p. 20 of the committee's report) but many witnesses testified, we should look to better use of authority already provided before concluding that additional authority is needed or could be wisely exercised if granted. In this light the total import of part VI of the report is in contradiction with the burden of testimony from witnesses closest to the subject.

In the final analysis we must designate to some responsible Government agency the determination of that which is or is not deleterious to the public health. We must recognize existing facilities which allow for the licensing of pesticides. Then, having arrived at that point, we must designate the policing agency to maintain a protective procedure so that our consuming public may be assured that what they consume is safe.

In the Public Health Service, the Department of Agriculture, and the Food and Drug Administration we have responsible agencies. Failure on the part of Congress to recognize their abilities to contribute to orderly progress is a sin of omission we must avoid. Failure in this committee's report to point out, at every turn, the good work of these agencies can leave but a negative conclusion with everyone.

We need faith in Government. We need both a feeling of security and encouragement in the hearts of our producers. We should assure the security of the consumer. Our Government is doing that. Let us admit it.

WALT HORAN.

HUDSON MAKES ITS OWN KRAFT in a modern, electronically controlled mill that sets new standards in kraft manufacturing. The strength and quality of your Hudson Multiwall Sacks are uniform, because Hudson controls every step in the manufacturing process from tree to the finished sack.

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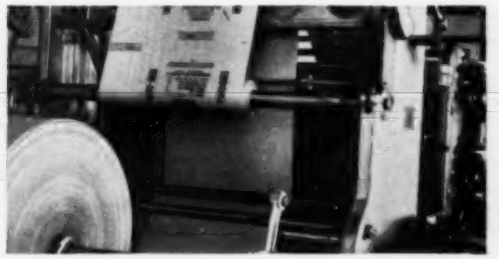

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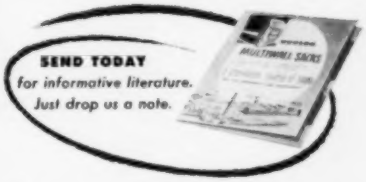

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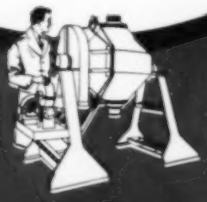

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Pesticide Formulations

For proof of acceptance, we have referred in the past to users of DILUEX whose annual consumption amounted to trainloads. Whatever statement was made in such terms a year ago would be an understatement now. On merit, the demand for DILUEX has multiplied.

In impregnating liquid toxicants—milling DDT, BHC, or other organics—conditioning blended dusts, DILUEX gives the greatest assurance of quality in the finished product.

Production facilities have been enlarged to keep pace with all anticipated requirements. Inquiries and orders will receive prompt attention.

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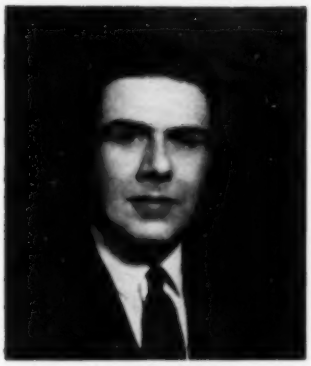
INDUSTRY NEWS

Cyanamid Ups Gleissner



DR. GLEISSNER

American Cyanamid Company has announced the appointment of Dr. Bruce D. Gleissner to the position of manager of the Insecticide Department, effective June 9th. He was advanced to this post from the positions of assistant manager and acting manager, replacing the late H. J. Langhorst.

Dr. Gleissner started his career at Pennsylvania State College where he was assistant professor of entomology. He joined Cyanamid in 1944 and has been closely associated with Cyanamid's development of "Thiophos" Parathion, phosphatic insecticide, starting from original research on the product and carrying through field development and sales.

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Del-Mar-Va Group Meets

The Del-Mar-Va Peninsula Fertilizer Association held its annual meeting at the George Washington Hotel, Ocean City, Md., June 28. The business session occupied the entire morning, and the afternoon was devoted to recreational activities.

The Del-Mar-Va president, W. A. Ross, W. B. Tilghman Co., presided at the business session and introduced speakers representing the American Plant Food Council, the National Fertilizer Association, and the fertilizer safety section of the National Safety Council.

Louis H. Wilson, secretary of the American Plant Food Council, Washington, addressed the group briefly, followed by W. R. Allstetter, vice-president of the National Fertilizer Association, also of Washington.

Main speaker of the morning was Dr. Arthur H. Smith, Mathieson Chemical Corp., Baltimore, who presented a history of the fertilizer industry in the area and statistics on manufacturing, grades of material and tonnages consumed during past years.

A. B. Pettit, Davison Chemical Corp., Baltimore, brought the group up to date on progress in developing safety-consciousness in the fertilizer industry and urged the members of the Delmarva Association to send representatives to the annual safety meeting in Chicago, October 21-23. This meeting, to be held at the Sheraton hotel, promises to be even larger than last year's overflow crowd, he said.

Governor Elbert N. Carvel of Delaware, former president of the Association and always active in its affairs, was unable to attend this year's meeting.

•

IMC Elects Ware, McDougal

Thomas M. Ware and Edward D. McDougal, Jr., were elected vice presidents, and C. M. Edwards was elected secretary of International Minerals & Chemical Corporation, at a recent meeting of the board of directors, according to announcement by Louis Ware, president.

Thomas Ware has been chief engineer of the corporation since 1949 and in his new capacity will be vice president in charge of the engineering division. He is a son of Mr. Louis Ware. Mr. McDougal has been secretary and general counsel of the corporation since 1947, and in his new capacity as vice president also will continue as general counsel. Mr. Edwards has been associated with International Minerals since 1929, serving as manager of the tax department and assistant secretary of the corporation.

Named V-C Officer

A. J. DICKINSON, JR.

Alfred J. Dickinson, Jr., was elected a vice-president of Virginia-Carolina Chemical Corporation at a meeting of the board of directors in New York on June 27.

Dickinson first became associated with the Richmond, Va., firm in 1939 as assistant to the comptroller. Following World War II and service with the Federal Bureau of Investigation and the U. S. Marine Corps, Air Combat Intelligence, he returned to the company in the purchasing department. In 1947 he became acting manager of that department and was named manager in 1948.

A native of Eufaula, Alabama, Dickinson is a graduate of the University of Richmond and the School of Business Administration of Harvard University.

•

Delaney Report to Congress

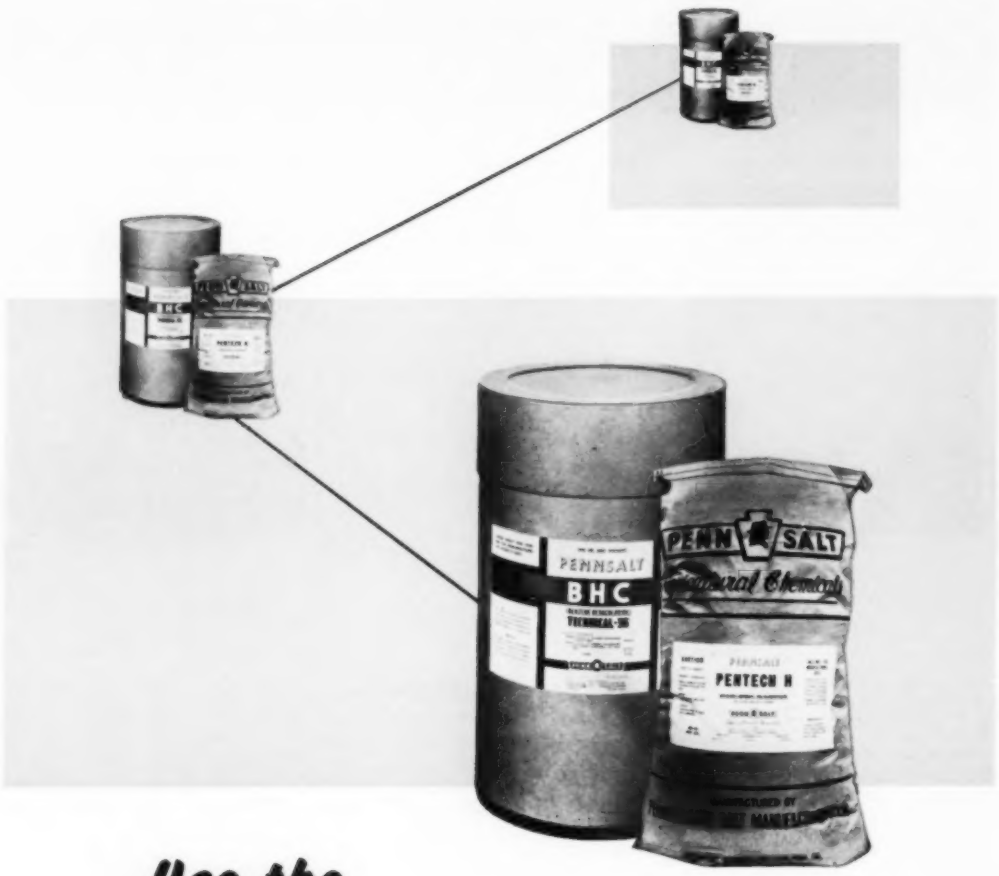
The Delaney Committee had just submitted to Congress at press time, a report on its findings on chemical additives to foods, including pesticides. The report affirms claims made by the Food and Drug Administration, that all chemical additives for use in or on foods, should be pretested and approved by FDA before being placed on the market.

FDA had proposed that 60 day's notice should be given before marketing and during this period, the FDA would study the product from data furnished by the manufacturer.

The industry has regarded this arrangement as "cumbersome and unworkable"; placing the entire burden of proof upon the manufacturer. The FDA says that under present laws, a product must prove harmful before anything can be done to protect the public.

Spokesmen for the committee indicated that the bill for enactment of such legislation will probably be presented at the next session of Congress.

A separate report has been filed by a minority of the committee, signed by Walter Horan. For details see article facing page 82B.



Use the one-two wallop of Pennsalt BHC-DDT

Here are two powerful, chlorinated insecticides which you can use in combination to control a wider range of insects . . . especially in cotton formulations and for cattle sprays and dips.

But whether you use them together or singly, you gain certain formulating advantages which are built into these modern, Pennsalt-developed products. Compare these Pennsalt features with those of other insecticides.

1. PENNSALT BHC TECHNICAL 36—up to three times as much of the gamma isomer . . . the *active* isomer against insects . . . proportionately less of the others. Less to handle, ship and store . . . better field strength formulations.

2. PENTECH—technical DDT made by a patented process which reduces the wax-like nature of the technical material and makes it *friable*. Makes dust-preparation easier.

Other Formulating Aids Available

Pennsalt DB-50
(50% DDT dust base)

Pennsalt D-12
(12% gamma BHC dust base)

Pennsalt 9:15 Concentrate
(BHC-DDT Combination)

Always remember that you gain by dealing with a basic producer, and Pennsalt is a leading *basic* producer. This assures you of uniformly high quality, dependable source of supply, and economy. And Pennsalt has the technical know-how to help you spray-apply these insecticides at lower melting points during impregnation. Write us for technical assistance. Agricultural Chemicals Dept., Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa., Tacoma, Washington; Bryan, Texas; Montgomery, Alabama; Portland, Oregon; Los Angeles, Berkeley, Calif.

PENNSALT CHEMICALS
for industry · Agriculture · Health · Home

PROGRESSIVE CHEMISTRY FOR OVER A CENTURY

A. L. Mehring, USDA Fertilizer Div., Retires

ARNON L. Mehring, U. S. Department of Agriculture fertilizer expert, retired on June 30 after some 38 years of government service, most of which were devoted to research on fertilizers. In retirement, he expects to maintain his home in Hyattsville, Md. and do research on problems of interest to him.

His career with the government service began in 1913 when he took a job in the post office department as a typist. Night school at George Washington University prepared him for a broader career in chemistry and in 1922 his career in fertilizer technology began upon his graduation with a B.S. degree. Dr. W. H. Ross of the Bureau of Soils was his project leader for many years. Under his supervision Mr. Mehring constructed an electric furnace at Arlington Farm, Virginia and worked on the process for volatilizing phosphorus from phosphate rock. Other phases of the method for making superphosphate from furnace acid were developed by Waggaman, Easterwood, Royster and others. The perfected process is now in commercial operation. Other projects were a new method for the preparation of potassium nitrate, granulation of fertilizers, factors affecting the drillability of fertilizers, placement of fertilizers in cotton planting, the efficiency of fertilizer distributors, effects of irregular distribution of fertilizers on cotton yields, measurement of drillability, methods for reducing the cost of fertilizers to the farmer, elimination of unnecessary filler, higher-analysis grades, the complete composition of fertilizers, and effects of particle size on the efficiency of fertilizers.

In 1934 Mr. Mehring showed that changes in sources of raw materials had resulted in the average mixed fertilizer being very acid in physiological reaction, whereas before 1907 the average mixture had been basic in its effect on soils. He then started a campaign to get manufacturers to replace sand with dolomite as a filler and this was so successful that by 1937 nearly a half million tons of dolomite were used in making mixed fertilizers.

Prior to 1934, the National Fertilizer Association had been compiling statistics on the use of commercial fertilizers, but information on their nutrient content was lacking and badly needed. At the request of H. R. Smalley, chief agronomist of the N.F.A. and with the approval of the Department, Mr. Mehring made the first survey of plant nutrient consumption in the United States. The N.F.A. published the results in its 11th annual proceedings.

A. L. MEHRING

In World War II, Mr. Mehring was detailed as consultant on fertilizers to P. H. Groggins, chief of the Agricultural Chemicals Division of the Office of Agricultural War Relations. There he helped to locate new synthetic nitrogen plants, to arrange shipments of fertilizers to avoid unnecessarily long hauls, to organize the fertilizer industry advisory committee, to allocate nitrogen during the shortage in 1942, to standardize fertilizer grades in order to save labor, materials and transportation and to determine the fertilizer requirements by crops and States so as to make the most efficient use of available supplies and facilities. During this time he was a member of the fertilizer committee of the International Emergency Food Council.

After the war, he became a senior chemist in the Division of Fertilizers and Agricultural Lime of the Bureau of Plant Industry at Beltsville, where he was project leader in charge of the Fertilizer Requirements and Consumption Trends Section.

Mr. Mehring has published more than one hundred bulletins and journal articles on fertilizer technology, and several are still in press. Most of the recent ones were concerned with economics and agronomy.

•

Pacific APS Meets

The Pacific Division of the American Phytopathological Society held its 34th annual meeting at Oregon State College, Corvallis, June 19-21. Chairman of the opening session was Roy Young, Corvallis. A dozen technical papers on fungous diseases were scheduled for presentation in this period. A concurrent session on physiology of disease, was held under the chairmanship of John R. Hardison, also of Corvallis.

A symposium on nematodes was held Thursday afternoon, with C. E Scott, Berkeley California, as moderator. Topics discussed included "Soil Fumigation as a control for Plant Parasitic Nematodes"; and "Acute and Potential Nematode Problems Confronting Us Today."

Another symposium discussed the subject of legume viruses, with F. P. McWhorter, Corvallis, moderator.

The program for June 20, consisted of a section on soil organisms, with Folke Johnson, Puyallup, Washington, as chairman; and another on virus diseases, with Hugh Kirkpatrick, Wenatchee, Washington, as chairman.

A business session was held that afternoon, followed by a session of technical papers on fungicides and fumigants. Lewis F Roth, Corvallis, was chairman. A concurrent session on miscellaneous diseases was held under the chairmanship of B. H. Wadley, Logan, Utah.

The Phytopathologists' banquet was held Friday night and the the meeting ended on Saturday with an all-day field trip under the direction of Dr. John A. Milbrath.

LION PROVIDES DEPENDABLE ONE-STOP NITROGEN SERVICE FOR FERTILIZER MANUFACTURERS

LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

LION

Serving Southern States

Lion provides special technical assistance for fertilizer manufacturers. Write us if you have a formulation problem.

LION OIL COMPANY

CHEMICAL DIVISION, EL DORADO, ARK.

Goodrich Appoints Score

Robert E. Score will handle the sale of "Good-rite" organic chemicals on the east coast and in

ROBERT E. SCORE

southeastern states for B. F. Goodrich Chemical Company according to an announcement by Robert P. Kenney, sales manager-chemicals. Mr. Score will headquarter in the company's New York office, 475 Fifth Avenue.

•

Cosmetic Report Made

Congressman James J. Delaney (D., N. Y.), chairman of the select committee to investigate the use of chemicals in food and cosmetics, submitted to the House the second section of a four-part report of the select committee, in June.

Titled "Cosmetics," the report announces that the evidence has convinced the committee that some cosmetic companies are not adequately testing their preparations to prevent injury to the public. The committee stated that insufficiently tested cosmetics constitute a source of considerable annoyance, discomfort, and disability.

In the last report, the committee declared that substances have been used in cosmetics which, because of their injurious effects, would have been excluded if a law had existed requiring that adequate information concerning their safety be obtained before the cosmetics were sold.

The committee reported that existing Federal law is inadequate to protect the public, and recommended that the Federal Food, Drug, and Cosmetic Act be amended to require that evidence of the safety of new cosmetic preparations be submitted to the FDA before they are marketed.

•

NACA To Meet Sept. 3-5

The National Agricultural Chemicals Association will hold its 19th annual fall convention at the Essex & Sussex, Spring Lake, N. J., September 3, 4 and 5. According to Lea S. Hitchner, NACA secretary, advance registration for the meeting is the heaviest on record. Alfred Weed of John Powell & Co., New York, is chairman of the Program Committee. Other committee members are Fred Hatch of Shell Chemical Corp., George Krieger of Ethyl Corp. and Richard Yates of Hercules Powder Co.

•

Stauffer Appoints Strong

Stauffer Chemical Company has announced the appointment of Ruldolph Strong as sales representa-

RUDOLPH STRONG

tive. His base of operations is to be Greenville, Mississippi, while his home office is in Houston, Texas.

Mr. Strong received both his B.A. and M.A. degrees from Mississippi State College in the fields of general agriculture and entomology respectively. His experience in the field of entomology has been quite extensive, including such positions as researcher for the Bureau of Entomology and Plant Quarantine, instructor of general zoology and entomology at Mississippi State College, and associate entomologist at L.S.U.

IMC Names Marshall

Maurice H. Lockwood, vice president in charge of the Plant Food Division of International Minerals &

SAMUEL P. MARSHALL, JR.

Chemical Corporation, has announced the appointment of Samuel P. Marshall Jr. as district sales manager of the division's Buffalo, N. Y., district, effective July 1.

Mr. Marshall will succeed L.A. Huntington, who has been district sales manager of the Buffalo district since 1937. He joined International in January, 1950, as a territory salesman in the Tupelo, Miss., district. A native of Virginia, he was graduated from Virginia Polytechnic Institute with a degree in agronomy. Before joining the International organization his experience included the U. S. Department of Agriculture in field work and agricultural development program under the direction of Mississippi State College. During the war he served with the army as battalion commander in the artillery force and was released with the rank of Lieutenant Colonel.

•

S-D May Buy Coronet Co.

Smith-Douglass Co., Norfolk, Va., has entered into an agreement with stockholders of Coronet Phosphate Co., to acquire majority stock in the company. Upon completion of this purchase, the Smith-Douglass firm is expected to make an offer for the remaining Coronet shares.

Coronet's plant is near Lakeland, Fla., and supplies phosphate rock to the fertilizer trade.

Du Pont Reports on

New Developments with EPN 300 Insecticide

Du Pont EPN 300 Insecticide, which was first introduced as a miticide for apples and other fruits, has now been found effective for control of various species of mites and insects on deciduous fruits, citrus, corn, tomatoes, onions and dry beans.

Outstanding for Peaches

EPN is being officially recommended in the major peach areas of the country for control of most of the important peach insects, especially plum curculio. Tests by Du Pont and other investigators during the past season have confirmed previous indications that EPN would give effective control of various mites and insects on many other crops.

New Research

The following list shows insects on which 1951 tests were especially successful, and shows some of the states where the principal EPN tests were made:

Citrus red mite, orange mite and fruit-tree leaf roller on citrus—*California*

Peach-tree borer—*Indiana, North Carolina, South Carolina, Georgia, New York*

Lesser peach-tree borer—*Ohio, New York*

Lecanium scale crawlers and peach cottony scale crawlers—*New York*

Bud moth on prunes—*California*

Grape-berry moth—*New York, Ohio, Pennsylvania*

Codling moth on apples—*Indiana, Virginia, New York*

Codling moth on pears and walnuts—*California*

Walnut aphid on walnuts—*California*

European corn borer—*Illinois, Minnesota, Ohio, Wisconsin*

Mexican bean beetle—*Delaware, New York*

Potato aphid on tomatoes—*Florida, New York*

Two-spotted mite on beans—*California, New York*

Russet mite on tomatoes—*Ohio, Texas*

EPN is listed in the official recommendations of 10 states plus the Western Cooperative Spray Conference and eight California counties for control of various mites and insects on peaches, pears, apples, plums, prunes, grapes, apricots, cherries, nectarines, walnuts and almonds. It is also recommended for mite control on apples in seven states and two California counties.

Dust Mixtures and Low-Volume Sprays

Dust mixtures made with Du Pont EPN 300 Insecticide have proved effective in experiments against various cotton insects, European corn borer and certain other insects on field crops. Experimental emulsifiable formulations of EPN have been tested in low-volume sprays for control of grasshoppers, sugar-beet webworm, European corn borer, and certain cotton insects.

EPN Insecticide is available from Du Pont as a wettable powder. For more detailed information, write Du Pont, Grasselli Chemicals Department, Wilmington, Delaware.

DU PONT
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DU PONT CHEMICALS FOR THE FARM INCLUDE:

Fungicides: PARZATE® (Liquid and Dry), FERMATE,® ZERLATE,® Copper-A (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs... Insecticides: DEENATE® DDT, MARLATE® Methoxychlor, LEXONE® Benzene Hexachloride, KRENITE® Dinitro Spray, EPN 300 Insecticide... Weed and Brush Killers: AMMATE,® 2,4-D, TCA, 2,4,5-T... Also: Du Pont Cotton Dusts, Du Pont Spreader Sticker, PARMONE® Fruit Drop Inhibitor, and many others. ®REG. U. S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

150th Anniversary

Better Things for Better Living
. . . through Chemistry

Am. Potash Buys Own Stock

A special meeting of the stockholders of American Potash & Chemical Corp. was to be held on July 10 to approve the corporation's purchase of 120,000 shares of its own Class A and Class B common stock from Mathieson Chemical Corp., Baltimore. The price is reported to be $40 a share. This stock was originally purchased by Mathieson from Heyden Chemical Corp.

Mathieson originally proposed to merge with American Potash and offered its own stock at the rate of eight shares for nine shares of American. However, the offer was not accepted, so American Potash arranged to acquire the stock. To finance the purchase, a loan of $4.8 million has been arranged on a five-year note, according to Peter Colefax president of A. P. & C. C.

Mr. Colefax also announced that contingent upon the approval by stockholders, Lehman Brothers, bankers, will purchase for investment, 17,225 shares of American held by Mathieson at the same price. If this arrangement were consummated, the outstanding shares of American Potash would be reduced to 408,390 shares from 528,390, or a reduction of 22.7%.

•

Western Plant Burns

Destruction of the Charles H. Lilly Seed Company fertilizer plant in Tacoma, Washington, was caused by a fire on June 2. Loss was estimated to be around $450,000. Cause of the blaze was not determined immediately. A series of explosions followed the fire and flames shot hundreds of feet into the air. Smoke was visible for more than 30 miles.

•

Retired Pennsalt VP Dies

North E. Bartlett, 82, former vice-president in charge of sales of the Pennsylvania Salt Manufacturing Company, died June 7 at his home near Easton, Md. He joined the Pennsylvania Salt Manufacturing Company in November, 1894 and was sent to Chicago as the first lye salesman in that territory which later became the center for Pennsalt's largest territory in this business. In January, 1925, he was made general sales agent and 3 years later was elected vice-president in charge of sales, a position he held until his retirement in 1943.

•

Bender Joins Cyanamid

ED. BENDER

Ed Bender, for the past six years with the University of Maryland, has taken a position of agriculturist with American Cyanamid Company. His new duties will take him into the Middle Atlantic states to engage in cooperative demonstrations and field research with growers, canners, universities and agricultural experiment stations with American Cyanamid products.

Mr. Bender was reared on a farm near Hanover, Pa., received his B. S. from Penn State College, his M. S. in Horticulture from the University of Maryland, and also attended the University of Hawaii while serving 18 months in the navy. Previously, he taught Voc-Ag. from 1941-44 in Bucks County, Pa.

•

New Kolker Product

Kolker Chemical Works, Inc., Newark, N. J. subsidiary of Diamond Alkali Company, has completed a three-year development and pilot plant production program, and now announces availability of p-chlorophenyl p-chlorobenzene sulphonate in commercial quantities. This chlorinated organic acaracide will be marketed under the designation "K-101," and can be formulated in dusts or sprays.

Large scale tests have been conducted in California where it has been determined that this material will control a wide variety of mites. These tests also showed that "'K-101" is compatible with a large number of insecticides and fungicides, and can be co-sprayed where required.

Compatibility is regarded as particularly important because mites have become a major problem with the advent of sprays that control their natural enemies.

Since "K-101" is compatible, it is applied simultaneously with the insecticides and prevents an uncontrolled period during which mites could increase. Also "K-101" has a long period (several weeks) of residual effectiveness and can be applied under most weather conditions, its makers state.

The new plant is located at the Newark headquarters of Kolker and produces "K-101" as a powder. The technical grade is easily handled in standard grinding and liquid formulating equipment.

This acaracide controls by ovicidal action, in addition to controlling the nymphal stages, and can be used on citrus and grape crops, almonds, walnuts, prunes, figs, melons, cotton, nursery stock and ornamentals. According to the company, it controls: Two-Spotted, Atlantic, Pacific, European Red, Willamette, Citrus-Spotted and Clover mites. The material is said to possess a low toxicity to warm-blooded animals.

•

Mathieson Buys Ark. Plant

Mathieson Chemical Corporation acquired the North Little Rock fertilizer facilities and buildings of Temple Cotton Oil Company, according to a joint announcement released by S. L. Nevins, vice-president and general manager of Mathieson's agricultural chemicals department and Latane Temple, president of Temple Cotton Oil Company.

The property, covering 10 acres, is near Mathieson's present fertilizer plant at North Little Rock and includes a fertilizer mixing unit, warehouses and loading facilities. T. E. Cochran, secretary-treasurer for Temple will become general manager of Mathieson's Temple division.

The acquisition, said Mr. Nevins, will improve and expand Mathieson's manufacturing, storage and distribution facilities.

FOR WEED AND BRUSH CONTROL

Kolker Quality Chemicals

GIVE GREATER KILLABILITY

2, 4-D WEED KILLERS...

... Esters and Amine salts.

Selected weed killers proved effective against annual and perennial weeds, many types of thistle and cress —and nettle.

2, 4, 5-T BRUSH KILLERS...

... Isopropyl and Butyl esters.

Low volatile, high kill esters of 2, 4, 5-T recommended and approved for mesquite and other brush control on range and grassland, along railroads, pipelines and other right-of-ways.

To meet increasing demands, Kolker—one of the nation's major producers of weed and brush control chemicals—has expanded production facilities at its Newark plant. Expert technical assistance supplied. Call on Kolker—and be sure of delivery at the right time, at the right price.

DIAMOND ALKALI COMPANY

Chemicals you live by

Other products of KOLKER CHEMICAL WORKS, DIAMOND ALKALI's subsidiary, specializing in organic chemicals for agriculture and industry, include:

DDT	Technical
BHC	Technical Grade (36% and 90% gamma)
LINDANE	90% gamma Isomer
2,4-D	Weed Killers
2,4,5-T	Brush Killers
K-101	Miticide

Order from

KOLKER CHEMICAL WORKS, INC.

80 LISTER AVENUE, NEWARK 5, NEW JERSEY

Plants: Newark, New Jersey and Houston, Texas

DIAMOND ALKALI CHEMICALS

Thurston Plans New Plant

Plans for a 2½ million dollar expansion program have been announced by Thurston Chemical Co., Joplin, Mo. The new processing plants will operate on a 24-hour-a-day basis and will employ from 30 to 40 additional people, according to Wm. R. Thurston, president of the firm. The plant operates in the states of Missouri, Kansas, Oklahoma, Arkansas, Iowa, Minnesota and Nebraska, and the upward trend of fertilizer use is sufficient to warrant the new expansion, Mr. Thurston said.

The company expects to supply not only the regularly recognized grades of fertilizer, but also other grades recommended by federal and state agencies throughout the area served.

A present plant, located at Atlas, Mo., will be used in conjunction with the new installations. With these new facilities, the company expects to increase its total output of plant food by approximately fifty percent.

Thurston only recently signed contracts for a plant to be erected at Trenton, Mo., as part of the expansion program. This plant will become an outlet for new products to be produced in Joplin.

•

Departments Consolidated

The research department of Sharples Chemicals, Inc. will be integrated with the research and development division of the parent company, Pennsylvania Salt Manufacturing Co., it has been announced by Dr. W. A. LaLande, Jr., manager of Pennsalt's division.

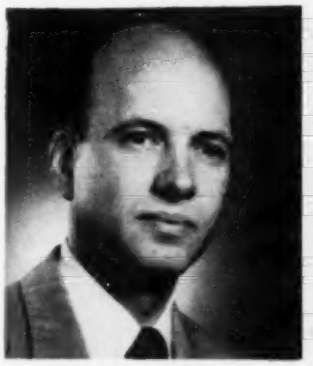
The integration was to occur between June 15 and Sept. 15, Dr. LaLande said. Meanwhile, laboratory facilities at Whitemarsh Hall were being considerably extended by the conversion of additional rooms to laboratories and rearrangement of existing facilities to provide not only for the addition of Sharples research personnel but also to increase Pennsalt's facilities.

Certain organizational changes have been made to accomplish these objectives. Dr. John F. Gall, currently supervisor of research, will become director of the inorganic research department. Dr. John F. Olin, director of research for Sharples Chemicals, will be the director of the organic research department in the new organization, with Dr. George McCoy, at present Pennsalt's organic group leader, as technical assistant director, and T. E. Deger, Sharples assistant research director, as administrative assistant director.

William L. Lee and Ford R. Lowdermilk, at present supervisors of the product development and process engineering departments, will become directors of those departments. The analytical section will be given department status, with Dr. Paul A. Munter as supervisor.

IMC Names H. H. Douthit and J. K. Lindsey

INTERNATIONAL Minerals & Chemical Corp. Chicago, has announced two appointments in its Plant Food Division. Harold H. Douthit has been named area manager of the territory comprising the Buffalo and Cincinnati sales district and plants, and Jack K. Lindsey has become district sales manager for the Cincinnati district.



H. H. DOUTHIT

J. K. LINDSEY

Mr. Douthit has had extensive experience in the fertilizer business. He joined International in 1949 as a technical service representative in promotional development for the Potash Division. In November, 1951, he was transferred to the Plant Food Division as assistant to the sales manager. A native of Missouri, he was graduated from the University of Missouri College of Agriculture with a major in soils. He is a member of the American Society of Agronomy and the Cincinnati Sales Executive Council .

Mr. Lindsey succeeds Roy Monroe, retired, as district sales manager in Cincinnati. His experience in the plant food industry includes both complete fertilizers and material sales. He is a native of Mississippi and a graduate of Mississippi State College, where he majored in soils in the school of agriculture. During World War II he served in the U. S. Navy in the Pacific as an officer in the Amphibious Corps. He joined International on January 1, this year.

•

Chisholm to Am. Chem. Pt.

Dan W. Chisholm has joined the sales staff of the Agricultural Chemicals Division of American Chemical Paint Co., according to an announcement made by the company. Mr. Chisholm will represent A.C.P. in the Gulf States of Louisiana, Mississippi and Alabama. He was recently awarded an M.S. degree in agronomy from South Dakota State College where he was a research assistant for two years.

Announcing IPC

WEED CONTROL CHEMICAL

Now Available from U.S.I.

Easy-to-use fine crystals of 99% purity supplied to formulators

New sales opportunities for weed killer formulators have resulted from the development of IPC. It opens up a whole range of market opportunities in serving the growers of strawberries, bulb crops, legumes, flax, peas, beans and other broad-leaved crops with effective weed killers.

And it becomes even easier for weed killer formulators to produce products for this market now that U.S.I. announces its production of an improved IPC basic chemical. IPC as it is made by U.S.I. is not only of at least 99% purity, but it is in fleecy, light, fine crystals which go into solution rapidly and which give you an easy-to-use form of IPC for your production.

QUALITY and PURITY: Yours from U.S.I.

You will want to compare the new U.S.I. product with other IPC chemicals, and when you do you will find differences *you can see*, a difference which will convince you that your best source of IPC chemicals for future production is U.S.I.

U.S.I. can supply you with IPC in its pure form (minimum 99% purity) in 200-pound fiber drums. Standard mixing equipment is used to formulate finished IPC products, with any one of several standard solvents being used in the processing.

WRITE OR CALL the U.S.I. office nearest you, or write to the New York office, for a sample of the new IPC as only U.S.I. makes it. With the sample, you will receive specifications, properties, solubility tables, suggested application rates and other information you want on IPC.

TENTATIVE SPECIFICATIONS

IPC Weed Control Chemical from U.S.I.
(isopropyl N-phenylcarbamate) $C_{10}H_{13}NO_2$

Physical form— fine, needle-like crystals
Color— white to light gray
Odor— very slight to odorless
Purity— 99% minimum
Melting point — 85-88° C.
Molecular Weight — 179.21
Volatility — slightly volatile at temperatures below melting point.
Stability— stable for indefinite periods under normal storage conditions.
Corrosion — Non-corrosive to metals normally employed in handling equipment.
Toxicity— Apparently not toxic to humans or animals. Continued skin contact and inhalation of IPC dust should be avoided as a precautionary measure.
Package — available from U.S.I. in 200-pound fiber drums.
Possible formulations — either a wettable powder (mixture of IPC, diluent and wetting agent) or an emulsion (an emulsified solution of IPC in an organic solvent).

Further information and samples available from U.S.I. office nearest you, or by writing to New York office.

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Branches in all principal cities.

Study Ammonia On Soil

A fellowship to study the effects of ammonia on soil was to be initiated July 1 by the Agricultural Experiment Station of Rutgers University, according to Dr. William H. Martin, director.

He announced that the fellowship will be financed by a grant of $2,500 per year from Suburban Farm Service Company, Whippany, N. J., subsidiary of Suburban Propane Gas Corporation, which is introducing anhydrous ammonia in the east as a nitrogenous fertilizer.

The fellowship will be directed by Dr. Firman E. Bear, chairman of the Soils Department of the Experiment Station. Dr. Bear said that the use of anhydrous ammonia as a fertilizer for farm crops has aroused considerable interest in this state. A substantial increase in the yield of corn on the Station farm, for example, was produced by an application of anhydrous ammonia between the rows at the time of the last cultivation. He adds, however, that more needs to be known about the effect of the ammonia on the chemistry of the soil and its organisms.

•

Release New Coined Names

The name "chloranil" was recently approved as the coined name for the fungicidal chemical, tetrachloro-para-benzoquinone, according to an announcement by the Interdepartmental Committee on Pest Control. They announced also that the word "malathon" has been selected as a coined name for the insecticidal chemical 0,0-dimethyl dithiophosphate of diethyl mercaptosuccinate. Malathon has been registered by American Cyanamid Co., New York as a trademark in the United States and all important foreign countries.

•

Sales Division Formed

Monsanto Chemical Co., St. Louis, Mo., has formed a new Merchandising Division to handle consumer sales of Krilium soil conditioner for the home gardener. Roy L. Brandenburger, formerly assistant to vice-president F. N. Williams, has been appointed general manager of the new division.

The sale of Krilium for large scale agricultural uses and for erosion control will continue to be under the direction of the company's Organic Chemicals Division, according to president Charles A. Thomas.

•

Kans. Pathologist Retires

Professor Leo. E. Melchers relinquished his administrative duties at Kansas State College on July 1, to devote his time to teaching, research, and writing, the college has announced. For the past 39 years he has been active as instructor, investigator and head of the department of Botany and Plant Pathology at Kansas State. He will continue in the department as professor of botany.

For two years he was on leave to be chief mycologist for the Egyptian Ministry of Agriculture, the first American scientist to be appointed to any position by the Egyptian government.

PICCO hi-solv 30

a light petroleum solvent

for Insecticide Concentrates

This highly refined aromatic petroleum naphtha combines high solvency with the ideal rate of evaporation for insecticides. Extensive use has shown Picco Hi-Solv 30 to be an excellent vehicle for insecticides such as DDT, chlorinated camphene and the like.

We will be glad to send complete data and samples for testing.

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PENNSYLVANIA
INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA
Plants at Clairton, Pa., West Elizabeth, Pa., and Chester, Pa.

CFA Winners Announced

The California Fertilizer Association has announced winners of an essay contest sponsored by the CFA Soil Improvement Committee. Subject of the essay for 1952 was "Use of Fertilizers on Irrigated and Dry Land Pastures." First prize, an award of $75, went to Joe Filippi, a vocational agricultural student at Chaffey Junior College, Ontario, Calif. Because a student of Chaffey has won the grand award for three consecutive years, the school has been allowed to keep the trophy as its permanent property.

According to Sidney H. Bierly, executive secretary and manager of the Association, other awards of $15 each were presented to students of Fullerton Junior College, Oceanside Jr. College, Orange Coast Jr. College, Palomar Jr. College and Santa Ana Jr. College.

•

Int'l. Minerals Names Four

The following appointments have recently been announced by the Plant Food Division of Int'l. Minerals & Chemical Corp., Chicago: E. Meade Wilson, area manager, Mulberry, Fla.; D. N. Barksdale, assistant to Mr. Wilson; W. P. Burke, district sales manager, Albany, Ga.; S. Ralph Smith, succeeding Mr. Burke as area credit manager.

•

Fertilizer Exec. Dies

Edward N. Wulbern, formerly vice-president of Wulbern Fertilizer Co., Charleston, N.C., died recently in Charleston at the age of 82. He had been ill only a brief time.

At the time of his death, he was vice-president of the Consumers Coal Co., in Charleston.

•

Coppinger, IMC, Dies

Joseph M. Coppinger, 60, purchasing agent for International Minerals & Chemical Corp., Chicago, died June 19 in a hospital at Clifton Forge, Va., after suffering a heart attack the previous day while attending the National Fertilizer Association meeting at the Greenbrier hotel, White Sulphur Springs, W. Va.

Mr. Coppinger, associated with IMC since 1909, had formerly resided in New York and Atlanta and moved to the Chicago area in 1941.

ANNOUNCING

Nitrogen Division

ALLIED CHEMICAL & DYE CORPORATION

NITROGEN DIVISION, Allied Chemical & Dye Corporation, was formed June 1, 1952, by combining the Sales Agency Department of The Barrett Division and the Nitrogen and Organic Chemicals Sections of The Solvay Process Division, Allied Chemical & Dye Corporation.

The Sales Agency Department of The Barrett Division formerly sold the nitrogen products manufactured by The Solvay Process Division. The formation of the Nitrogen Division consolidates production and sales into one organization, thus streamlining these two operations for greater efficiency.

Nitrogen Division now operates and markets the output of the Nitrogen plants at Hopewell, Virginia, and South Point, Ohio. Some of the products now handled by the Nitrogen Division are listed below.

Other new plants and new products will be announced at an early date.

Anhydrous Ammonia • Nitrogen Solutions • URANA† Solution
ARCADIAN*, *the American* Nitrate of Soda • A-N-L* Nitrogen Fertilizer
Sulphate of Ammonia • NYTRON* (Synthetic Organic Detergent)

Production and sales will be handled by essentially the same personnel that has functioned heretofore . . . your assurance of high standards of product quality and reliable, dependable service.

*Trade-Mark Reg. U. S. Pat. Off. †Reg. Applied For.

Nitrogen Division
ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.
Richmond 19, Va. • South Point, Ohio • Hopewell, Va.
Columbia 1, S. C. • Atlanta 3, Ga. • San Francisco 3, Cal.

Mathieson Names Johnson

Lester E. Johnson has been appointed product manager of Mathieson Chemical Corporation's organic chemicals department, it has been announced by Russell Hopkinson, vice president.

Before joining Mathieson, Mr. Johnson was assistant to the manager, chemical sales development, U. S. Industrial Chemicals Company. He is executive secretary of the Commercial Chemical Development Association and formerly chairman of its public relations committee.

He is a graduate of the University of South Dakota with a Bachelor of Science degree in 1933, and the University of Cincinnati with a Masters degree in Engineering Science in 1938.

•

APS to Feature Panel

To be included on the program of the annual meeting of the American Phytopathological Society September 8-10 at Cornell University, Ithaca, N. Y., will be a symposium on plant-parasitic nematodes and their control. According to Dr. A. C. Tarjan, University of Rhode Island, Kingston, this will be the first time that the Society has attempted to present a symposium of this character at an annual meeting.

Speakers scheduled to appear on the symposium include the following experts and their respective topics:

C. W. McBeth, Shell Agricultural Laboratory, Modesto, California, "Methods of Assaying Nematicides"; J. R. Christie, U. S. D. A., Sanford, Florida, "Plant - ectoparasitic nematodes"; D. J. Raski, University of California, Berkeley "Methods of detecting and investigating plant-parasitic nematodes"; G. Steiner, U. S. D. A., Beltsville, Maryland "Phenomena and problems of the internal parasitism of nematodes in plants"; A. L. Taylor, U.S.D.A., Beltsville, Maryland "Progress and prospects in the chemical control of nematodes"; and G. Thorne, U. S. D.A. Salt Lake City Utah "Representative types of plant-parasitic nematodes and their identification."

The full program for the annual APS meeting is expected to be ready for publication in the August issue of *Agricultural Chemicals*.

•

Clark, Cyanamid, Retires

C. B Clark, director of the Patent Department of American Cyanamid Company's Stamford Research Laboratories, was to retire June 30, 1952, following twenty-three years of service with the company. He is a native of North Russell, New York, and a graduate of St. Lawrence University.

•

Outline Potato Protection

Charles W. Grimm, Kern County, Calif. agricultural commissioner recently announced that four entomologists from the United States Department of Agriculture had been assigned to the county in an effort to prevent damage to the potato crop by golden nematodes. Outlining his plan, Commissioner Grimm stated that a preliminary investigation shows no infestations yet, but its presence in California has been noted and this is the reason for stationing the four entomologists in the state. They will make field studies throughout the state. Last year, the pests did considerable damage in New York and Idaho.

•

New Pennsalt Defoliant

"Penco De-Fol-Ate," a new improved chlorate type cotton defoliant, has been developed for commercial use by the Pennsylvania Salt Manufacturing Company of Washington.

The new defoliant is said to assure efficient leaf removal, minimizes lint-staining and excess trash, and halts late insect infestation.

The defoliant is applied as an air spray, at the rate of 8 to 10 pounds in 10 gallons of water per acre. It dissolves readily in the spray tanks with no subsequent sludge formation. It is not toxic, hazardous nor unpleasant to handle, and is relatively non-corrosive to equipment and sprays, its makers state.

The new product has been extensively field tested under a variety of soil and atmospheric conditions throughout the west. It is normally effective in the absence of dews and at very low humidity. Under suitable conditions, defoliation can be expected in 7 to 10 days.

•

90% Gamma BHC Offered

Kolker Chemical Works, Inc., has announced availability of 90 per cent gamma isomer BHC. With only slightly more expense, manufacturers can now formulate emulsion-concentrate and wettable-powder insecticides with high percentages of gamma BHC and low phytotoxicity, the makers state.

Most interest in the new concentration is in the province of cotton insect control. The use of low gamma technical BHC in emulsion concentrates presents formulating problems that are avoided with the use of 90 per cent gamma BHC. The resulting emulsion concentrate fills the void between 36 per cent technical BHC and lindane (99 per cent gamma isomer).

The new concentration is produced at Houston, in Kolker's new plant that also produces lindane. Introduction of the new chemical makes available concentrations of 12, 36, 90 and 99 per cent gamma isomer BHC from a single source.

•

Chemist Added to Staff

Hayes-Sammons Chemical Co., Mission, Texas, has expanded its laboratory facilities and has acquired the services of Harry Holton who, upon completion of the expanded lab, will work with liquid concentrates and dusts. Mr. Holton is a graduate of the University of Texas.

•

To Economic Poisons Post

A. J. Forgash was recently appointed assistant research specialist in chemistry at the Extension Service, College of Agriculture and Experiment Station, Rutgers University, New Jersey. In his new post, Mr. Forgash will work primarily on the distribution and use of economic poisons in New Jersey.

CONTROL { INSECTS / WEEDS / FUNGUS / FERTILIZER } AT LESS COST WITH...

WARREN Hi-Clearance

HEAVY-DUTY self-propelled SPRAYER

because it's built for dependable year 'round operation

Owners say, "Warren keeps our entire spray program on the ground. Costs per acre are low—chemical control is more effective."

Warren is fast and versatile—works equally well in high or low crops. It's adaptable to year 'round spraying of insecticides, fungicides, herbicides and will apply liquid fertilizer.

Buy Warren and you get a machine that will handle your complete spray program. *Some of the largest canners and commercial operators own fleets of Warren Sprayers.*

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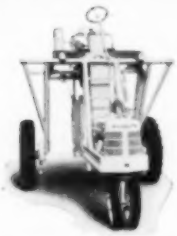

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- Pump capacity up to 20 g.p.m.
- Pump pressures up to 800 lbs.
- Crop clearance—7 feet.
- Mechanical agitation in 275-gal. tank.
- Welded tubular construction.
- Powered by 24 h.p. International.

WARREN DIVISION—AMERICAN STEEL DREDGE CO. INC.
DEPT. AC—FORT WAYNE, INDIANA

Defoliant Makes Bow

"Endothal," said by its makers to be the first complex organic chemical compound used successfully for defoliation, is being marketed this season in limited quantities by the Pennsylvania Salt Manufacturing Co. and by Pennsalt of Washington as "Pennsalt Endothal Defoliant S-4069."

The agricultural applications of endothal (disodium 3, 6-endoxo-hexa-hydrophthalate) were discovered early in 1948 by Sharples Chemicals, Inc., a subsidiary of Pennsalt. Since that time endothal has been field tested extensively, and while this program is being continued through the present growing season, it has developed far enough so that definite commercial uses have proved practical, the company says.

Tests have been concentrated in cotton-growing areas, both because "endothal" showed the most promise in this crop and because defoliation is of relatively greater importance in cotton. In these tests it was discovered that the chemical's action closely parallels natural defoliation—that is instead of simply killing the leaf it causes an abscission to form at the butt of the leaf stem, thereby causing the leaf to drop while still green.

The product is said to be more effective than some other defoliants in arid areas, where moisture stress in the plants frequently makes defoliation more difficult. In tests for soil contamination it was found that it is virtually non-existent in the case of endothal because the product is disintegrated quickly and completely by soil micro-organisms.

Under most conditions, tests have show, endothal is fairly economical, requiring about one gallon per acre of cotton. "Endothal" is sold in liquid form, in 5 and 54 gallon drums, and goes into water solution rapidly and completely, its makers state. It is readily adaptable to application by airplane spray as long as proper drift precautions are observed.

Numerous tests also have been conducted in the past few seasons on other uses for endothal. It has shown excellent promise, testers report, as a defoliant or pre-harvest dessicant on a relatively wide range of crops, even when used in moderate amounts. Some of these crops are soybeans, dry beans, white potatoes, rice, corn, small grains, flax and legume seed crops. It also has been successfully tested as a defoliant on nursery stock.

"Endothal's" applications as a herbicide indicate that it may offer the answer to some of the present problems inherent in weed killing, according to the manufacturers. Tests on pre-emergence and post-emergence treatment on the basis of individual plant tolerances have shown favorable results on weeds not normally controlled by other chemicals and difficut to control by cultivation.

Basic endothal is being manufactured and formulated into various products ready for field use at the Sharples Chemicals plant at Wyan-

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MINERAL SALTS

One of the country's foremost producers of Agricultural Chemicals and Soluble Mineral Salts.

COPPER SULPHATE

ZINC SULPHATE

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For MANUFACTURERS, MIXERS And CHEMISTS

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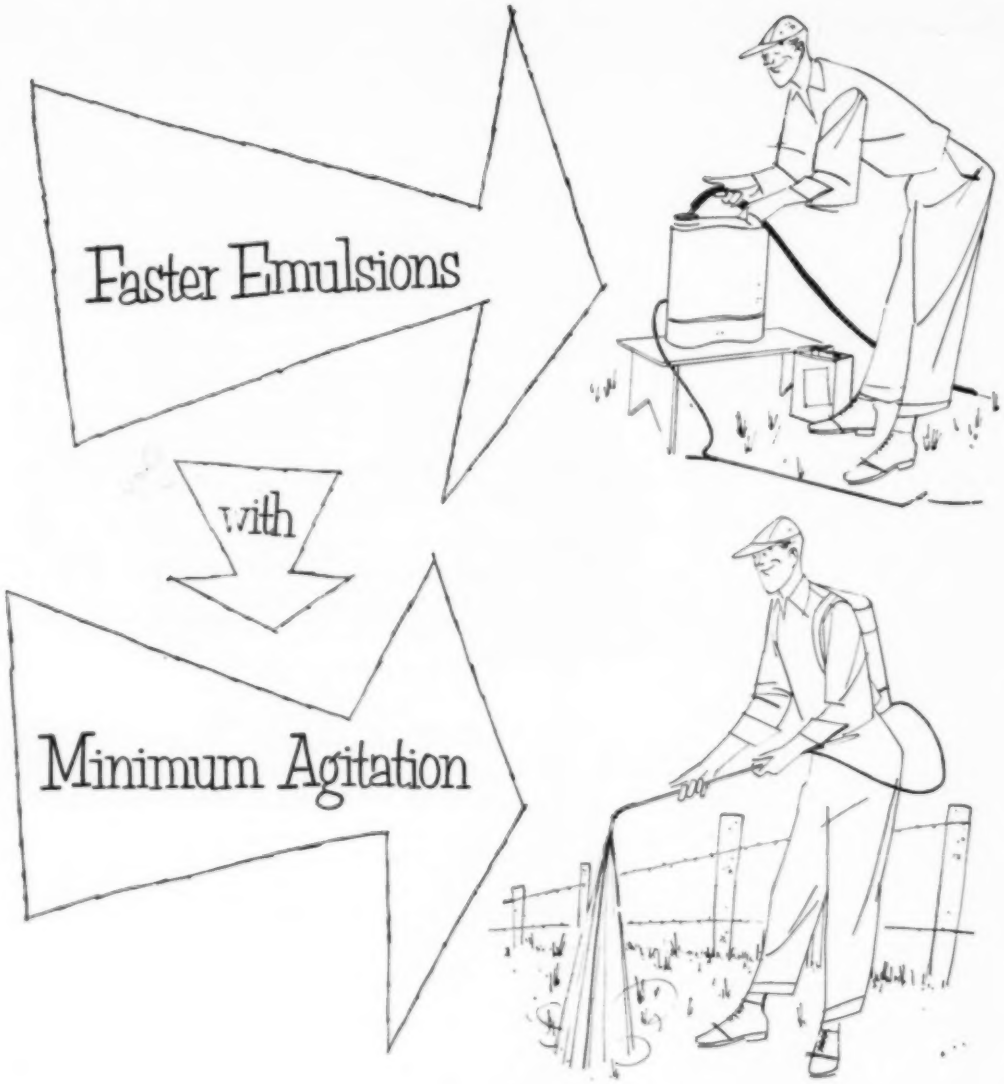

Emulsions last longer — disperse faster — with Armour's Etho-chemicals

Armour's oil-soluble, water-dispersible Etho-chemicals make any emulsification easier and faster—and longer-lasting. For instance, Ethomeen S/12 and Ethomeen S/15, mildly cationic chemicals which are not affected by water hardness, combine to form an excellent emulsifier for 2,4-D isopropyl ester, even in extremely low concentrations.

Another excellent emulsifier is Ethofat 142/20, a non-ionic chemical for use with kerosene or xylol as a solvent. Chlordane can be emulsified directly into water with this chemical, without a solvent.

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Armour and Company, 1355 W. 31st St., Chicago 9, Ill.

dotte, Mich. Sales are being handled through Pennsalt's Agricultural Chemicals Department, 1000 Widener Building, Philadelphia 7, Pa., and by Pennsalt of Washington at Tacoma.

•

Ky. Changes Labeling

Beginning July 1, fertilizer sold in Kentucky must carry information about the guaranteed analysis printed directly on the containers or on a label provided by the manufacturer. Formerly, this information was given on an official Kentucky tag supplied manufacturers by the agricultural experiment station at the University of Kentucky.

Under a law passed by the legislature, fertilizer manufacturers may choose the method of labeling. The guarantee information may be printed directly on the bag or the same information put on a tag or label. In all cases it is the duty of the manufacturer to provide the labeling. This differs from the method followed in the past in that the experiment station no longer will supply tags.

Invoices for fertilizer sold in bulk will be accompanied by a guarantee as to the plant food content. This guarantee will be in the same terms as is called for in fertilizer bags.

The field inspection service, laboratory analysis and publication of reports by the Agricultural Experiment Station for over 60 years will be continued.

•

Named Davison Manager

Ralph E. Hope has been appointed manager of research engineering of Davison Chemical Corporation, Baltimore, the company has announced. Mr. Hope for the last two year has been Davison's representative at Warrington, England, on the design and operation of a plant built by an affiliate of Lever Brothers & Unilever Ltd., for the production of petroleum cracking catalyst by the Davison microspheroidal process.

Prior to going to England, Mr. Hope was plant engineer at Davison's Cincinnati catalyst plant. He studied mechanical engineering at the University of Cincinnati and did graduate work in chemical engineering at the University of Michigan.

•

Clayton Named Iowa Mgr.

The appointment of Harold E. Clayton as manager of The Davison Chemical Corporation's plant at Perry, Iowa, has been announced by W. N. Watmough, Jr., vice-president.

Mr. Clayton is a native Iowan, but has been connected with Davison in various supervisory capacities in Ohio and Maryland for fifteen years, and goes to Perry from Columbus, Ohio, where he was in charge of the corporation's production. He succeeds Mr. Russell M. Sloman, who has been transferred to the Alliance, Ohio, plant.

Go the scientific way...go **MGK**

AEROSOL INSECTICIDE CONCENTRATES

SPRAY INSECTICIDE CONCENTRATES

DUST INSECTICIDE CONCENTRATES

You may want complete formulas . . . ready to put right into your aerosol bombs or your retail packages. You may want combinations of insecticides and synergists that leave you only the minimum of processing to do. You may want to do most of the processing yourself and to you we offer the purest toxicants and synergists in their primary forms. MGK has the *best* of whatever you want. The emblem "MGK" is satisfying assurance of high efficiency and scientific production in insecticides and insecticide ingredients. Let this single experienced source help you make better products for less money. For complete information about MGK prices write 1703 Southeast Fifth St., Minneapolis, Minn.

Scarabaeus sacer Sacred beetle of ancient Egypt. Model for carved stone amulets and scarabs.

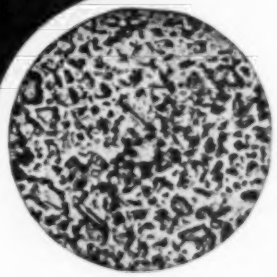
THE PIONEERS OF PYRETHRUM AND ALLETHRIN

Good insecticides protect America's health and harvest.

McLAUGHLIN GORMLEY KING COMPANY

An Outstanding Record

in RAYMOND ROLLER MILL Performance



THE wide utility and economical operation of the Raymond Roller Mill for grinding and blending many different insecticide formulations have made it the outstanding unit in use.

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The slow speed of the grinding elements and the air cooling and conveying system help to eliminate sticking and build-up tendencies. The Mill gives superior results in the preparation of finer grades of sulphur and sulphur-bearing formulations, as well as concentrations of filler and DDT, BHC, Toxaphene and similar products.

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Based on performance you can depend on the Raymond Whizzer-Equipped Roller Mill to give you a premium product and, at the same time, keep down costs through automatic, dustless operation and low maintenance.

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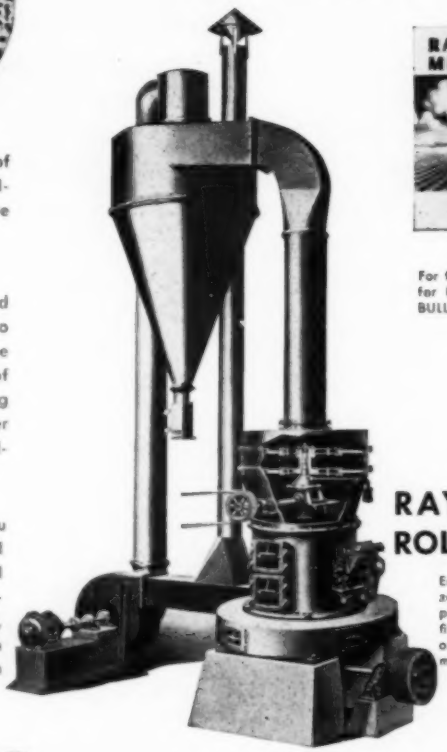
RAYMOND BOOTH #170

For further details, write for Raymond Insecticide BULLETIN #68.



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Raymond
PULVERIZER DIVISION

SALES OFFICES IN PRINCIPAL CITIES

APFC MEETS

(Continued from Page 73)

at one time, we can be devoured individually."

Mr. Newsom said that "there are important obstacles . . . that must be met if farmers are to meet the nation's increasing food requirements and utilize additional fertilizer produced by the fertilizer industry," adding that "certainly foremost among the problems is agricultural legislation."

"I strongly emphasize that the basis of our legislative program is acceptance of responsibility by the individual," he said. "This is in sharp contrast to the concepts of some groups and organizations who hold that big government is the answer to our problems. The Grange feels that the individual, including the farmer, has the responsibility for assuming a larger share of the problems we face today.

"The Grange believes that agricultural legislation should be directed toward an increasing number of self-financing programs. That price supports should be flexible and based upon the new modernized parity formula. Price support should take into account changing conditions with respect to cost of production and consumer demand. They should be at a level to shield farmers from bankruptcy but they should not serve as high income guarantees. On occasions, the Grange has been severely criticized for its support of flexible price guarantees. We recognize there is some ground for the opposite position which holds that in the face of big government, big labor, and big business, the farmer has no alternative but to rely upon the government to establish his prices. We do not subscribe to this philosophy.

"Only by concerted effort have we been able to prevent this very thing from happening, however, some prominent government leaders are advocating levels of price supports and price ceilings that actually amount to fixed prices . . . closing the gap between support levels of the department of agriculture and price ceilings of OPS. We have fought this concept on the basis that the best regulator of production yet devised by man is price incentive. When you remove this mechanism, there is no alternative but to accept rigid government control over farm production. This is the only way farmers would know what to produce.

"We believe this is a dangerous trend for its forecasts increasing government jurisdiction and control over, not only agriculture, but other segment of our economy as well."

Mr. Newsom termed fertilizer "an essential production tool" and added that farmers "have relied on it in the past and undoubtedly will rely upon it more in the future" for increasing both the total agricultural production and the efficiency of that production.

The Grange master's talk was frequently interrupted by applause,

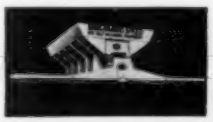
The only COMPLETE LINE

- ALLOY STEEL CONSTRUCTION GIVES MAXIMUM PAYLOAD.
- 13 basic agricultural models, each built to do a better spreading job of materials for which designed.
- Lengths from 9 to 33 ft. (5 to 30 tons capacity) . . . 1 to 6 compartments for selective unloading of different materials.
- Available with single or double spreading distributor.
- Four different gear reductions and drag chain flight spacing . . . this controls volume from a few hundred lbs. to 3 or more tons per acre.
- Complete selection of conveyor bottom widths.
- Controlled volume and spread pattern at any truck speed. Oil-sealed clutch and 3-speed transmission regulate rate of discharge from body . . . velocity of spinner remains in constant ratio to engine speed because of direct drive.

ASK-3-8

ASK-3W-6

FERTILIZER SPRAYER holds the spread to the ground and makes it stick. Covers up to 4 acres to the mile at 15 miles per hour.



ROCK PHOSPHATE SPREADER ATTACHMENT gives uniform spreads on the level, slopes and hillsides. Designed to prevent materials from packing and crusting.

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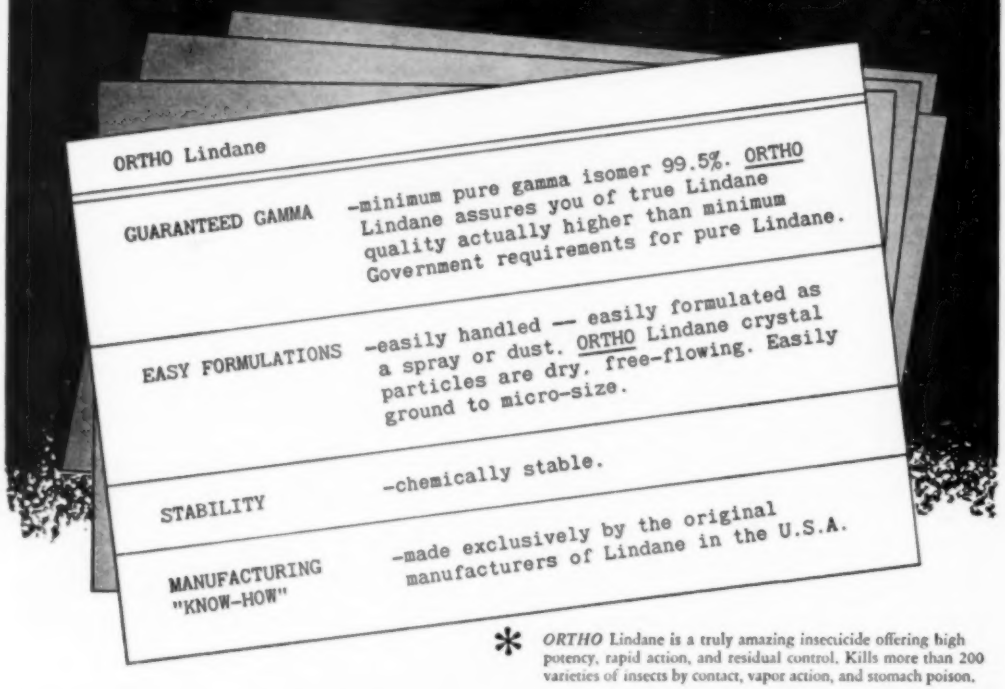
861 SHIPMAN ROAD JERSEYVILLE, ILLINOIS
"There is a Baughman Distributor Near You"

FORMULATORS!
only ORTHO Lindane* gives you all these advantages:



ORTHO Lindane	
GUARANTEED GAMMA	-minimum pure gamma isomer 99.5%. ORTHO Lindane assures you of true Lindane quality actually higher than minimum Government requirements for pure Lindane.
EASY FORMULATIONS	-easily handled — easily formulated as a spray or dust. ORTHO Lindane crystal particles are dry, free-flowing. Easily ground to micro-size.
STABILITY	-chemically stable.
MANUFACTURING "KNOW-HOW"	-made exclusively by the original manufacturers of Lindane in the U.S.A.

* *ORTHO* Lindane is a truly amazing insecticide offering high potency, rapid action, and residual control. Kills more than 200 varieties of insects by contact, vapor action, and stomach poison.

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World leader in scientific pest control

ORTHO

SCIENTIFIC PEST CONTROL

and as the discourse ended, the group gave him a spontaneous standing ovation.

The fertilizer outlook for years ahead was discussed by W. A. Minor, as the final talk of the morning program. He declared that there must be high production on the farm and emphasized that "it looks like we will have to keep right on shooting for big production next year, and the years after that."

He spoke on "Our Job in Fertilizer Utilization," and said that "as our country has grown in size and prestige, the contribution which fertilizer has made to agricultural production has been of ever-increasing significance."

"Over the years," he added, "fertilizer has helped open up new and better production areas, has helped get the production job done over a wider range of seasons and in ever-larger quantities."

Mr. Minor said that "in each of the last 13 years, we have reached a new peak in the annual use of fertilizer on our farms," but added that "the supply of fertilizer in recent years has not kept pace with farmers' needs."

"We need more fertilizer and lime for the very simple reason that we must have high-level production on our farms," he said. "United States farmers, last year, produced about 40 percent more than before the war. Production goals for 1952 call for an all-time record output of crops and livestock—6 percent above last year and almost 50 percent above the 1935-39 average. Attainment of those increases—even partial attainment—will require a record use of fertilizer.

"But even if we reach the goals, we will not much more than hold our own when it comes to such crops as feed grains and cotton. It looks as though we shall have to keep right on shooting for big production next year, and the years after that."

Mr. Minor said that "(1) the bulk of our future farm production must come from land already in use; (2) Each acre must be made to produce more; and (3) From now forward science must be hitched to every plow in the land."

In viewing the capacity of American farms to meet increasing requirements for food and fiber, Mr. Minor said that "full advantage should be taken of all improved production practices," but emphasized that "the great importance of fertilizer in our present-day agricultural economy explains fully . . . the department of agriculture's keen interest in maintaining adequate supplies and in assuring efficient use of these plant foods."

"The Department and the Land-Grant Colleges and Universities have a joint responsibility for promoting the efficient and proper use of fertilizer and lime," he said. "Eventual optimum use of fertilizer and lime will require an expanded long-range program of research and education geared as closely as possible to the food and fiber production program and the need to build soil fertility reserves. The immediate prob-

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(Neutral Zinc)

The High Test Nutritional Basic Zinc

56% Zinc as Metallic

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MANGANO

(Neutral Manganese)

The High Test Nutritional Manganese

55% Mn as Metallic

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It will pay you, too, to get the free facts about chlordane effectiveness and ease of application in wettable powders, dusts, water-emulsions and in fertilizer-admixtures. Please write for bulletins.

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Lawn Moths
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Onion Maggots
Onion Thrips
Plum Curculio
Sarcoptic Mange
Seed-Corn Maggots
Serpentine Leaf Miners
Sheep Kad
Sod Webworms
Southern Corn Rootworms
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Strawberry Weevils
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Ticks
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lem, however, is the need to help farmers achieve the best possible results from the increased supplies of fertilizer materials which will become available in the next few years.

"How to utilize fertilizer and lime most effectively, to accomplish the twin objectives of increasing food and fiber production and at the same time building up the productive capacity of the nation's farm plant, is a problem of concern to all of us—farmers, government, private industry, and the public as a whole," Mr. Minor concluded.

The annual APFC banquet, held Saturday evening, was the largest in the Council's history. Senator Harry F. Byrd, (D-VA.) condemned the "spendthrift" policies pursued by government and warned against this course which has been proceeding steadily towards state socialism. Unless this trend is checked quickly, it will destroy the American system, he declared.

Senator Byrd asserted "our free enterprise system is a greater deterrent to Russian aggression than the United Nations ever will be" and declared "socialization of our industry would be just as deadly to the productive capacity of our system as Russian totalitarianism."

He said "present signs indicate an engulfing global war is not in the Russian plans for the immediate future," but emphasized "our military defenses should be made impregnable."

Referring to the President, he said "it is an insult to our intelligence to assume that we do not realize that the adoption of the President's program will commit us irrevocably to a socialized state from which there is no retreat."

"If the President is against socialism, the people of this country are entitled to receive from him satisfactory answers to these questions;" he added. "Why does he continue to pressurize Congress to adopt socialized medicine? Why is he advocating the Brannan Plan, which inevitably means socialized agriculture? Why is he advocating another extension of socialized housing?

"These three proposals alone would mean socialization of your health, your food and the roof over your head," he asserted.

"There are many doors to the house of socialism. It is very easy to get in but very hard to get out."

NFA MEETING

(*Continued from Page 35*)

through individual initiative and enterprise, to a vague "freedom from want" in which the federal government is expected to play the role of guarantor of everything everyone wants. The European idea of security is that he is most secure who leans most on government for protection against the greatest number of contingencies. This is completely at odds with the American ideal of opportunity which enables one to reap the rewards of his own efforts; to realize

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fulfillment of his dreams, of his investments and savings commensurate with his own ability. This is a far cry from the modern idea of getting associated with government to be secure; not through individual accomplishment, but through collectivism and government ownership.

There might be some argument for such collectivism if history could show a single instance in any area of the world where government ownership and operation has succeeded better than has private ownership. The record proves, he said, that private effort produces better goods faster, and more economically, than can any government-operated enterprise.

He said that the real test of a system lies in how well the system operates under adversity. Almost any setup is satisfactory when the going is easy, he said, but what will happen when adversity hits? Hitler got along fairly well until the world-wide depression began to be felt in Germany. He then had to raise an army and launch a tremendous war machine to keep going. His system broke down when challenged by adversity, the Senator said. The same proved true with Mussolini and will be the story of Stalin, too, he predicted.

Grouping into three categories those who tend to slip into the delusion of collectivism, Senator Mundt cited the "Fuzzy-minded theorists," many of whom otherwise are fine Americans, but are utterly unrealistic people. They are those who operate under the banner of "liberalism" and advocate complete control of government.

The second group are "Evil-Minded Corruptionists" who seek office to steal, rather than to serve. He warned that the effects of such faithless public servants is far more serious than the funds they steal. Such acts of government officials engender in the public mind a cynical attitude toward tax collectors which, if carried to the extent of a tax rebellion, would completely bankrupt the nation. If the attitude toward federal tax enforcement becomes like that of the general public was toward the 18th amendment, then we are *through*, he warned.

The American people are morally bound to send men to public office who will serve honestly and intelligently, and not because there is gold in them Potomac hills."

Finally, there are the "Alien-Minded Communists," numbering about 50,000, according to the Federal Bureau of Investigation. In addition, another half-million in this country are prepared to carry out communist orders in the event of a coup. He said that this constitutes a real menace to our way of life, and that our current national atmosphere is conducive to this type of treachery.

The Senator urged business men to interest themselves in politics; otherwise the *politicians* will certainly become interested in their businesses.

A thorough examination and appraisal of the national and world situation was presented by Dr. Milton S. Eisenhower, president of Pennsylvania State College, State College, Pa. Dr. Eisenhower reviewed some of

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the achievements of the U. S. and stated that beginning with 1620 and continuing through 1945, we had experienced only complete success in practically every undertaking. "But now, we find ourselved in a complex situation which will not be resolved quickly and in which there may never be complete or definitive success as we have known success in the past. We are now in a mighty struggle that is not so much for geographic empire as for intellectual empire. It is a struggle for the mastery of men's mind and very soul."

A second fact is that war can no longer be employed successfully to gain noble ends. Since modern war creates human misery and the economic and social chaos in which communism thrives and democracy tends to die, this means can't be used unless it is forced upon us.

Dr. Eisenhower expressed doubt that our present problems, difficult as they are, are any more perplexing than were the problems of 1776 in the minds of the early Americans. Only a third of the people wanted freedom, but they wanted it badly enough to get it. Actually, he declared, there is nothing the free nations of the world cannot accomplish, if they will. "We have the resources, the manpower, the skills and the social organization essential to a successful cooperative effort."

Construction of peace, Dr. Eisenhower said, may be divided into two time periods. The first involves emergency programs designed to prevent aggression and thus "buy time" for more fundamental development. Since the enemy's basic instincts are primitive, he respects nothing but power superior to his own. Thus, the U. S. must maintain a strong military establishment for perhaps a generation or more, and at the same time, be prepared for all-out mobilizatin should this be required.

To effect economy in the face of this, the U. S. needs to impose some austerity of its own; to realize that if we are to shift much of our energies and production to defense, then we must give up something else.

Economic instability or collapse in the U. S. could lead to loss of all of our freedoms, he warned. This would be followed by similar disasters in most of the countries of the world, making an ideal climate for communism to reach its goal.

The speaker declared that to build a permanent program for peace, a genuine understanding among the peoples of the world must be reached. We need to understand peoples of other nations as *people*, he said, and continued that most of the world's people regard Americans as being rich through no fault or effort of their own; of being night-clubbish, frivolous, and imperialistic.

"The real America has been hidden from them," he reminded. "They know nothing about the simple life that surrounds the rural churches of America; they know very little about the operation of our school system or about the working of our municipal, state and federal governments; they know essentially nothing

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about the America that is self-critical, generous and reverent."

He reminded that 75% of the world's population is living under strict censorship; behind Russia's iron curtain and the "lace curtains" of the Middle East, Africa and South America, thus being unable to learn the truth. At the same time the communists are filling human minds everywhere with treacherous lies 24 hours a day in 42 languages. "In this phase of the world struggle, we of the United States and other free countries have been fighting with pop-guns and pea-shooters when we should have been dropping intellectual atomic bombs," Dr. Eisenhower declared.

"Our Agriculture and America's Defense" was discussed thoroughly by Allan B. Kline, president of the American Farm Bureau Federation. Mr. Kline made a plea for greater effort for more agricultural production and for an understanding of basic matters of the national economy. He warned that the basic struggle concerns the very survival of individual personality in the world, and that there are not many places in the world where this dignity is recognized. Signers of the Declaration of Independence had the kind of daring and foresight needed today to maintain liberty. "Those signers knew what they were doing was regarded as treason," he said, and continued that despite the apparent dangers, they went ahead to gamble their lives and fortunes on the ideal of liberty.

Opposed to this idea of individual dignity is dictatorship where the individual is nothing. This philosophy abounds in nearly every country, he said.

One of the chief objectives is that of avoiding a third world war. Korea, he pointed out, is not the real war. "If it makes sense at all, it is just an effort to avoid an all-out conflict," he told his hearers. The tools of world war III are not being used, and the main opponent is not being contacted directly. All efforts should be directed toward making dramatic strides toward the defense effort, but citizens must do all in their power to prevent big government from getting bigger. The threat of greater inflation must also be curbed, he said. In this regard, we must defend our right to earn rather than to accept government handouts which he described as a "snare and a delusion." No politician gives anyone anything, Mr. Kline pointed out. He merely gives back some of our own funds. If we keep industry in a straight-jacket, he warned, the United States will have lost much of its production potential in five years. Ceiling prices lower production, he declared, and a subsidy is the only alternative in this system. With all the world watching us, we should capitalize on this fact and demonstrate that democracy can work.

The farm bureau head hit at government deficits which come out of the value of dollars, savings and insurance. "It is certainly not easy to balance the federal budget, but it is the only solution to our economic ills," he said. He urged the Amer-

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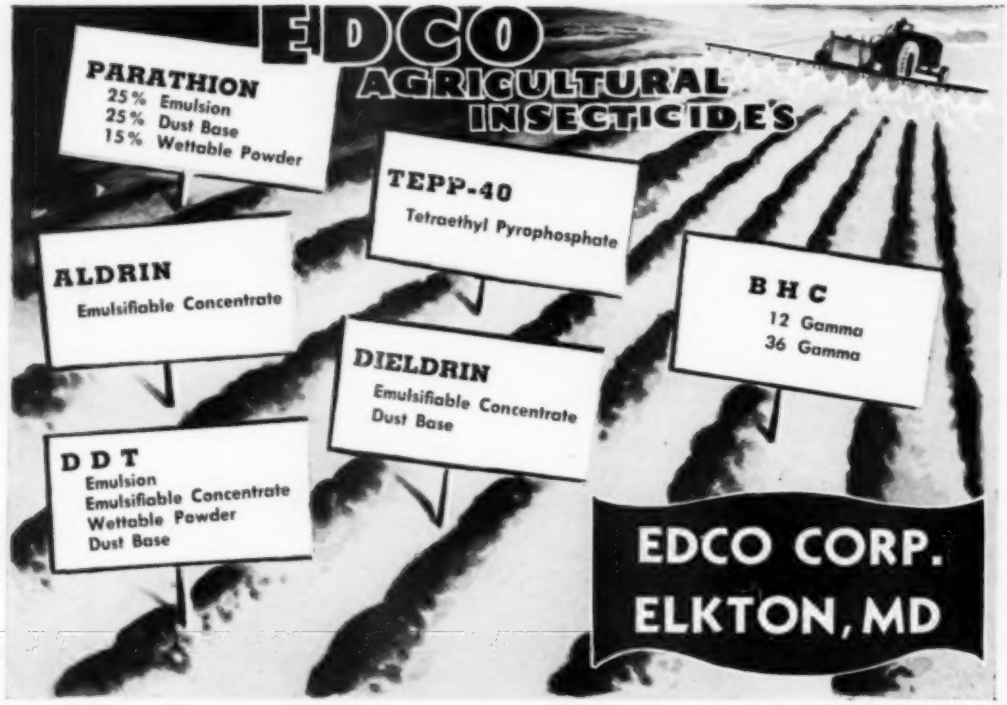

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Panel Discussion

PROBLEMS facing the industry regarding manufacturing were discussed Monday morning in an open meeting of the NFA Plant Food Research Committee. George V. Taylor, Spencer Chemical Co., Kansas City, Mo., was chairman of the panel and Dr. Edwin C. Kapusta, NFA, secretary. Participants, as noted earlier in this report, were Richard E. Bennett, F. W. Darner, Leroy Donald, R. M. Jones, R. A. MacDonald and H. B. Siems. G. F. MacLeod, Sunland Industries, Fresno, Calif., scheduled to appear on the panel, was unable to be present.

Dr. Kapusta, in his opening remarks, reiterated that one objective of the committee is to channel information on problems to the Tennessee Valley Authority where efforts will be made to solve these problems through research. The second phase, he said, consist of studying in detail, the accomplishments of TVA research and channeling these results to the fertilizer industry.

Among the research projects suggested by the audience at the meeting were the following:

1. Acidulation of rock phosphate to form directly a granular superphosphate.
2. Corrosion studies on process equipment used in manufacture of superphosphate.
3. Acid concentration and ratio used in super manufacture.
4. Study two stage acidulation processes.
5. Study of spent acid utilization—test and study acids from various sources. Effect of acid on properties of fertilizer. Safety and health hazards in use of these acids.
6. Technique of mixing fertilizer—stress development of new methods and equipment.
7. Fixation of ammonia and by-products such as lignin, sawdust, peat, etc.
8. Fertilizer analyses—rapid plant control methods needed. Correlate chemical evaluation of fertilizer with actual crop response.
9. Physical-chemical reactions in fertilizer mixtures.
10. Continued studies of solution phase in mixed fertilizers.
11. Hygroscopicity studies.
12. Granulation of fertilizers.
13. Effect of ammoniation rates, etc. on crop response to fertilizer.
14. Effect of dolomite addition on reactions in mixture. Effect on crop response.
15. Segregation in fertilizer mixtures. Effect of size, shape, density of materials. Study effect of particle size of product on crop response.

It was emphasized that the fertilizer industry is badly in need of coordination of all research work that has been carried out on production of normal super-phosphate. Many workers, for instance, have studied such problems as optimum concentration of acid to be used, problems introduced by over-acidulation, corrosion of equipment, etc., but the findings of the various research workers still need to be coordinated.

One participant in the discussion questioned whether the industry knows enough about running spent acid, pointing out that such experience could be extremely important

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for the country in time of war, when raw materials are rationed. He asked whether the T. V. A. might be able to give the industry the benefit of its own experience in running spent acid.

In connection with the discussion of ammoniation, one speaker asked whether we may not need new types of mixers.

In a discussion of the physical condition of fertilizers, attention was directed to the use of conditioners and granulation. It was pointed out however that these two approaches do not necessarily represent the entire answer to the problem. One speaker stated that physical state is largely a matter of hygroscopicity.

Associated with problems of fertilizer technology, said another participant in the discussion, should be an evaluation of fertilizers. He emphasized that study of the two problems should go hand in hand. The industry needs to know, for instance, how variations in formulation affect the ability of different fertilizer mixtures to grow crops.

Problems of segregation were discussed by another speaker, who pointed out that whenever there are marked differences in the particle sizes of the various elements in a mixture, segregation always results. Samples may thus not run uniform, and a product runs the risk of being marked "deficient." The problem becomes even more acute with high analysis fertilizer.

It was suggested as a solution to this problem, that the industry select a set of uniform particle sizes. This suggestion will be studied by a committee of the N. F. A. who will attempt to select the best set of particle sizes. In connection with the study, the following tentative list will be considered:

+4 mesh
−4 +10
−10 +20
−20 +40
−40 +60
−60

Concluding the discussion of the contribution which T. V. A. may make to the solution of the fertilizer industry's problems, it was pointed out that T. V. A. has many facilities for basic physical chemical research. The industry was urged to take advantage of them.

On the social side, the conventioneers were invited to three receptions on two afternoons. Hosts at the functions were H. J. Baker & Bro., American Potash & Chemical Co. and International Minerals & Chemical Corporation.

There was dancing in the evening and following the banquet on Tuesday, the group was entertained by the "Skyliners," a male quartet.

FERTILIZERS

(*Continued from Page 50*)

phosphoric acid shortage has apparently aroused our people to the seriousness of the situation.

During the last few months a number of fertilizer manufacturers have begun serious consideration of the several processes using nitric acid

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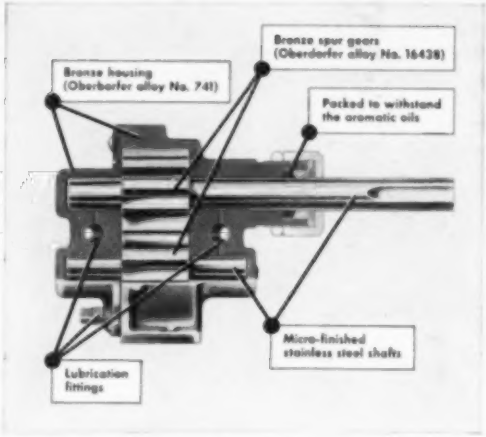
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in the production of available phosphates. The Tennessee Valley Authority is operating a pilot plant which among other processes being tried out, has a promising one which acidulates with a mixture of nitric and sulfuric acids, ammoniates, adds potash and produces a complete fertilizer. Of particular interest in most of these processes is that the ammoniation of the acidulated product requires as much anhydrous ammonia as is used to manufacture the nitric acid in acidulation. One of the obstacles would seem to be the probable necessity for large completely integrated plants including nitrogen fixation plants, nitric and sulfuric acid plants, acidulating plants and mixing plants, complete to the bagging machines handling the final product, necessitating an investment of many million dollars.

The fertilizer industry now has some 205 separate acidulating plants producing superphosphate, and some additional 800 dry mixing plants dependent on these 200 acidulating plants for their supply of available phosphoric acid in the form of superphosphate. It is unthinkable that all these thousand plants will be scrapped to make way for a few very large integrated plants using one of these new processes. Part of our challenge covers research and achievement which will permit such small plants to stay in business. I am not advocating arbitrary blocking of progress or efficiency in manufacture, but I do want to see all avenues explored to the end that the "small business" category of our industry will be protected and maintained. Should it come to pass that our manufacturing technique must be so modified that it is only practicable to prepare our available phosphoric acid needs in large integrated plants, such plants may well be the source of raw material supply for the present dry-mixing plants. I would call your attention to the fact that our industry is still called upon to furnish more than 900 separate and distinct grades in spite of all the effort that has been put upon grade reduction. Large integrated plants cannot afford to manufacture a multiplicity of grades. They must confine their output to only a few. Should any of these new processes prove to be successful and economic in this country, it must be realized of course that such radical departures from present practices and products cannot take place overnight. There will be a period of design and construction, a period of education to the end that new products are proven and accepted, first, by our official agricultural agencies and finally by the farmer himself, with whom the proof of the pudding is the eating thereof. In the meantime we will continue to produce, perhaps ever-dwindling, but for many years at least, large tonnages of superphosphate with which to carry on as the newer products are developed.

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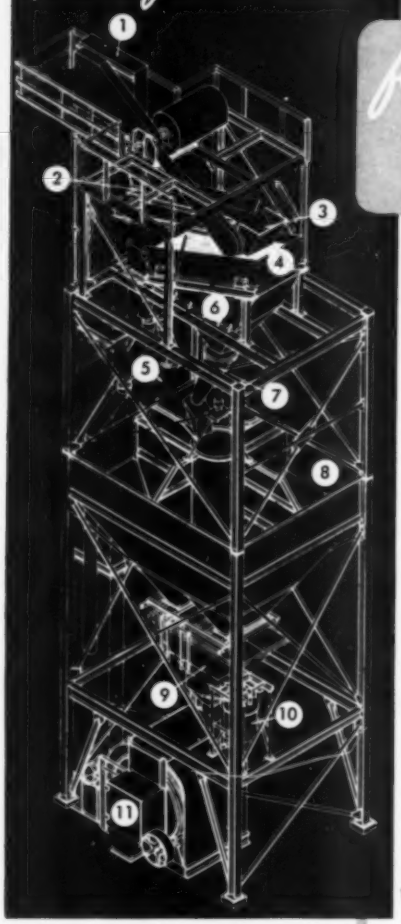

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Zwemer to Smith-Douglass

Smith-Douglass Co., Inc., Norfolk, Va., has announced the appointment of James H. Zwemer as manager of research and development. He will be in over all charge of production at all of the company's plants, with headquarters at Norfolk, the company states.

Mr. Zwemer is a graduate of Hope College, in Michigan, and holds an MS degree in chemistry from the University of Michigan. Since leaving college, Mr. Zwemer was associated with Monsanto Chemical Co. and was manager of its Norfolk plant from 1942 until 1951 at which time he was transferred to Muscle Shoals, Ala. as project manager in charge of the construction of a large chlorine caustic plant.

■

College Honors Bishopp

Dr. Fred C. Bishopp assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, was honored in June 6 by his alma mater, Colorado A & M College, Ft. Collins. He had received his bachelor's degree from Colorado in 1902 and his master's degree in 1926. His PhD was earned from Ohio State University in 1932.

The noted entomologist began his career with the U.S.D.A. in 1904 as a special field agent for the old Bureau of Entomology.

NEMATODES

(*Continued from Page 59*)

for four hours since this treatment seemed to be the heaviest that the plant material would tolerate. The winter cysts showed greater resistance to this treatment than the summer cysts. Controls had an average of 30 percent of cysts containing viable larvae. An average of 23.8 percent of the winter cysts contained viable larvae after exposures of four hours to 4 lbs. per 1000 cubic feet at normal atmospheric pressure, at 50% and at 90% vacuum. This represents a 20.7 percent kill. On the other hand, an average of only 2.6 percent of the summer cysts had viable contents after

exposure to the same treatments, the kill, when compared to the control, being 91.3 percent. Also, the 1 lb. of methyl bromide per 1000 cubic feet for 16 hours at normal atmospheric pressure, lethal to all the larvae in summer cysts, allowed some survival in the winter cysts (0.001 percent). The larvae from cysts exposed to these sublethal treatments were judged to be viable when they were stimulated by stroking in the region of the oesophagus. They did not, however, respond to the stimulatry effect of potato root leachings over a two-week period.

The only methyl bromide treatment tried that was judged to be efficient for kill of contents of both summer and winter cysts was the 11 lbs. per 1000 cubic feet for eight hours at normal atmospheric pressure. This treatment resulted in complete disintegration of the larvae.

Hot Water:

Also larvae in winter cysts showed higher resistance to hot water treatments than those in summer cysts. Invariably, exposures that resulted in complete kills in summer cysts (114° F. for 90 minutes, 116° F. for 40 minutes, 118° F. for 25 minutes, 120° F. for 25 minutes) allowed some survival in the winter cysts.

Treatment at 116° F. for 45 minutes, which had been reported to be effective, was found not to be a dependable treatment. Two replications contained viable larvae of both categories and two replications contained no viable larvae. Three replications of 120° F. for 25 minutes revealed this treatment to be unreliable. Larvae in winter cysts survived in all three.

The following treatments were judged to be lethal to larvae in both summer and winter cysts, on the basis of both microscopic examination and reaction to potato root leachings, those at 116° F. and 118° F. being doubly checked, and that at 120° F. being replicated fourteen times:

118° F.	three hours
114° F.	two hours
116° F.	55 minutes
118° F.	30 minutes
120° F.	30 minutes
125° F.	10 minutes

Conclusions

THE following treatments were found to be lethal to the contents of cysts of the golden nematode:

1) Dowicide 2, 1:2000 parts, for four minutes at 60° F., but there was apparently some difficulty in maintaining this concentration in solutions.

2) 0.5% formalin for ten minutes at 85° F.

3) Methyl bromide, 11 lbs. per 1000 cubic feet for eight hours at atmospheric pressure.

4) Hot water at 112° F. for three hours, 114° F. for two hours, 116° F. for 55 minutes, 118° F. for 30 minutes, 120° F. for 30 minutes, and 125° F. for 10 minutes.

In some sublethal treatments with both hot water and chemicals, a higher proportion of larvae survived in winter cysts than in summer cysts.

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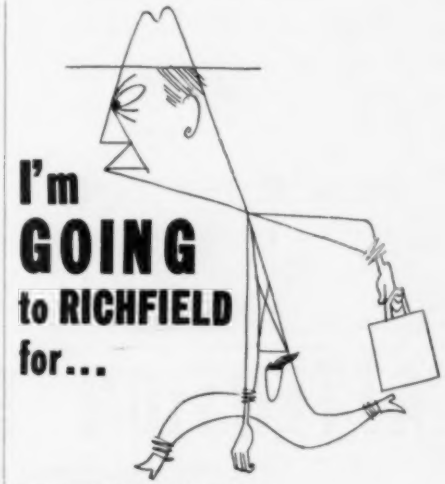
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MERCURY RESIDUES

(*Continued from Page 47*)

Tables 1 and 2 also show the comparison of mercury residues resulting from sprays of three different mercurials applied by June 20.

The residues resulting from one spray of each of three different mercurials at recommended dilutions were compared (Tables 3 and 4). Leaf and apple samples designated as "covered" were partially enclosed with cellophane strips, the lower end being left open until harvest to prevent collection and condensation of water. The apple and leaf samples from these "covered" areas showed no more residue than the uncovered areas. Evidently some factor other than rain reduced the residue.

Table 5 shows the residues resulting from one spray applied on August 23, about one month before harvest. Two different mercurials were used at a level 50% above the amount recommended.

Discussion. A single spray of mercury resulted in a small but measurable amount of residue. Apparently several factors affected the amount of residue present at harvest. The 1949 work indicated that rain between the time of application and harvest tended to reduce the residue. High orchard temperatures were perhaps also a factor in reducing the residue as indicated in the findings of Kunze [5] relative to the effect of temperature on the volatilization of mercury. Light may also be a factor in catalyzing the breakdown of the organic mercurial.

It would appear that harvest residues of mercury on apples should not be expected to exceed a few parts per billion unless sprayed late in the season.

In 1949, several weeks' time elapsed after the samples were taken before they could be extracted for analysis. It was thought this might have been partially responsible for the low residue values, that perhaps the results reflected the time of analysis rather than that of the time of sampling. However, in 1950 the samples were extracted for analysis as soon as received. Since these results confirm those of 1949, it would seem that the 1949 residues were actually low at the time of sampling.

Summary. 1. Using di-beta-naphthyl thiocarbazone reagent, mercury residue on apples was determined in amounts as low as a few parts per billion when an adequate size sample of fruit was taken for analysis.

2. Results of two years orchard experiments indicate that factors other than rain tend to dissipate the mercury residue on the fruit.

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(4) Laug, E. P. and Nelson, K. W., J. A. O. A. C. *25*, 399 (1942).
(5) Kunze, F. N., J. A. O. A. C. *31*, 438 (1948).

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- discusses the hazards to avoid in the formation, mixing, and use of compounds and evaluates their effect on plants, domestic animals, and man.
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Aquameter for Water Detm.

An instrument for the determination of water in foods and other products has been developed by Beckman Instruments, Inc., South Pasadena, Calif. Basically, the instrument consists of an electrically controlled titrating unit into which the sample is introduced. One to two minutes are required per determination. The instrument uses the Karl Fischer technique.

•

Named to U. S. C. of C.

William R. Thurston, president of Thurston Chemical Co., Joplin, Mo., has been elected a director of the United States Chamber of Commerce. He will represent the seventh district which is composed of the states of Missouri, Oklahoma, Kansas, Ark., Texas and Louisiana.

•

Point Four Aid Sought

Sir Herbert Broadley, deputy director of the United Nations Food and Agricultural Organization stated recently that unless adequate help is made available to the Middle East, locust plagues would sweep back toward their origin in Ethiopia and devastate areas as far south as Central Africa. Sir Herbert, on his way to discuss the problem with United States officials, stated that he hoped that representatives of the Point Four Program would agree to supply airplanes and personnel for the dusting programs that are essential if the locusts are to be eliminated.

•

Hudson Ups Grondona

Charles A. Grondona, vice-president on charge of operations of the Hudson Pulp & Paper Corp., announced the appointment of Joseph L. Richardson to the position of resident manager of the company's southern mill, located in Palatka, Florida. George Balko, who previously held this position, has been assigned to special duties with the company in New York.

Mr. Richardson joined Hudson in July, 1946 coming from the Gulf States Paper Corp. At that time Hudson was in the process of constructing its new mill at Palatka, Florida, which was opened in 1947.

•

New Plant in Kansas

Koehling - Thompson Company, Topeka, Kansas, has announced that it will establish a commercial fertilizer plant at Marysville, Kansas. The new plant is expected to be in operation about August first. Twenty-six persons will be employed in the new enterprise, it is indicated.

•

TECHNICAL BRIEFS

(*Continued from Page 71*)

Minn. Experiments show that best control comes from use of 7 pounds of 90 per cent TCA per acre, put on with 30 gallons of water. The TCA is applied as a pre-emergence spray, put on the ground after crops, such as sugar beet, are planted, but before the seed starts growing. Cost of application, including labor, runs about $4.50 an acre.

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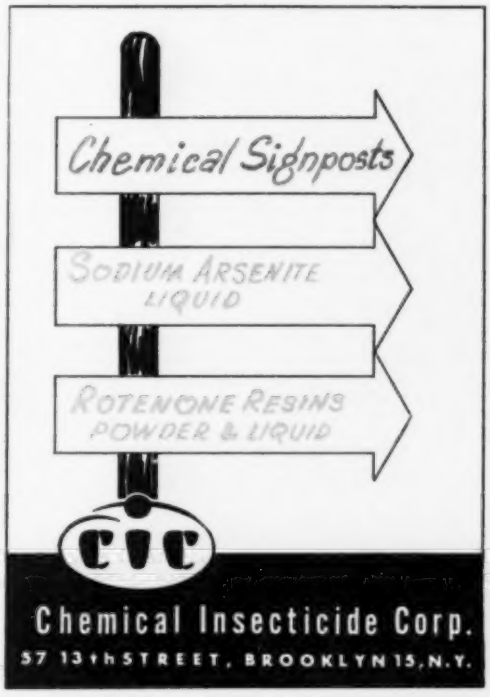

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August Grassland Meeting

Pennsylvania State College, State College, Pa., is to be the scene of the Sixth International Grassland Congress on August 17-23. The event is expected to attract a large attendance, including soil scientists, agronomists, fertilizer men and others interested in agricultural progress.

■

Blender to S. A. by Plane

In order to fill a rush order for a complete insecticide formulating plant, A. E. Poulsen & Co., Los Angeles, recently utilized the freight air lines to ship the machinery to Venezuela. The shipment comprised five crates totaling 10,000 pounds.

The equipment was an R.T.R. "Uni-Blender" compounding plant capable of producing up to four 40 cubic foot batches of field strength insecticides per hour. It was designed to be assembled and in operation within 24 hours after arrival. When set up, the unit occupies 9 x 12 feet of floor space and 13 feet of head room.

■

Casey Joins H. J. Baker

Edward T. Casey has joined H. J. Baker & Bro., New York, importers and exporters of heavy chemicals, fertilizer materials, and pharmaceuticals. Mr. Casey previously was a member of the sales staff of Irving R. Boody & Co. and Wessel & Duval, respectively.

SUPPLIERS BULLETINS

(*Continued from Page 65*)

pictured in the bulletin, illustrating the types available for various needs. One, designed for covering all parts of the body, is claimed to do this in a matter of 15 seconds. Others models cover only the upper parts of the body. The showers are all operated by a gate device which is actuated as soon as a person enters from either side.

The company states that all models can be furnished in any metal and finish required. Write for bulletin 30 in care of the company, P. O. Box 111, Glendale, Calif.

New Dust Control Brochure

Dust and Fume control in process industries is the subject of a comprehensive brochure just published by American Wheelabrator & Equipment Corporation, 1030 S. Byrkit Street, Mishawaka, Indiana. This booklet, "Industry Relies on Dustube for Efficient Dust and Fume Control," tells how cloth-tube-type dust collectors are handling complex problems in 33 typical installations including fertilizer manufacturing. All are illustrated. Copies of this brochure may be obtained from American Wheelabrator & Equipment Corporation.

●

Grassland Book Available

"Improving the World's Grasslands" is the title of a new book published by Leonard Hill, Ltd., London. Written by A. T. Semple, under the auspices of the Food and Agriculture Organization of the United Nations, the book discusses the importance of grasslands, their place in agriculture, grassland improvement, livestock management, mechanical treatment, national programs of grassland improvement, supplemental feeding, need for research, and seeding and fertilizing.

In the latter chapter, the author points out that only about three-fourth of what livestock consume can be returned to the soil in the form of manure; plant nutrients lost by soil erosion are often much greater than those carried away in the bodies of livestock; and soil deficiencies of phosphate, potash, sulfur and other elements can be overcome only by applying greater amounts than those removed by the pasture plants and returned under grazing. "The use of legumes and grasses in crop rotation, with liberal applications of commercial fertilizers to obtain the largest possible economic crop yields on livestock farms, builds up soil fertility," the author states.

The publishers are located at 17 Stratford Place, London W. 1.

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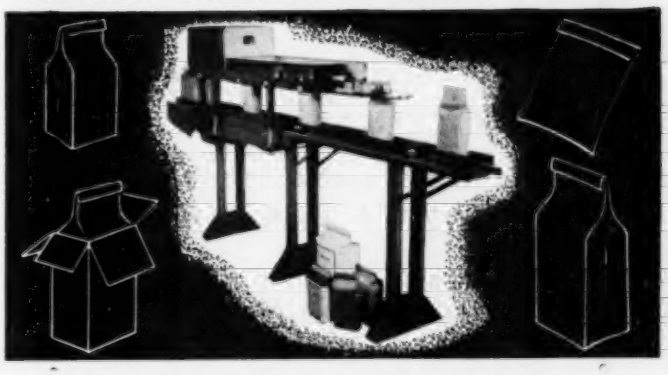

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FOR SALE: Agricultural chemical company, established only 4 years; grossed $80,000, netted $15,000 in '51 from seed bed and field soil fumigation, application of insecticides and weed-brush control. Operating in Conn. Valley. Excellent potential. Equipment, franchises, misc. assets and good will offered at $16,000. No. 2H-N8468. Chas. Ford & Assoc., Inc., Dept 2311, 10 N. Clark, Chicago, Illinois.

Miscellaneous

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Spray Recommendations

A 44-page bulletin, No. 419, giving "Spray Recommendations for Tree Fruits in Eastern Washington" was put out recently, and is available from the Institute of Agricultural Sciences, Agricultural Extension Service, Washington Agricultural Experiment Stations, The State College of Washington, Pullman, Washington.

The first page of the bulletin warns that parathion, TEPP, metacide, EPN 300, and malathon (4049) are among the most dangerous insecticides in common use, and that deaths have resulted from excessive exposures. General and specific recommendations are given.

•

Bag Storage Booklet

Hudson Pulp & Paper Corp., N. Y., offers the services of its multiwall sack specialists to all multiwall users, to make complete surveys of storage facilities and to recommend proper temperature and humidity conditions as well as the most economical means of effecting such changes.

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(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)
ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS
Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.
1118 Emerson Street
Palo Alto, California

E. C. PATTEE
Consulting Chemical Engineer
Plant Design
Plant Improvement
Process Development
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Provident Bank Building
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Carl N. Andersen, Ph.D
Consulting Chemist
Phenyl Mercury Compounds
Insecticides, Fungicides-
342 Madison Ave.
New York 17, N. Y.
Phone: VA 6-0492
Laboratory: Briarcliff Manor, New York
Phone: Briarcliff 6-1550

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MEETING CALENDAR

Soil Improvement Committee, Pacific Northwest Plant Food Association, Pocatello, Idaho, July 9, 10 & 11.

Ohio Pesticide Institute, Ohio Agricultural Experiment Station, Wooster, Ohio, Aug. 13 & 14.

Sixth International Grasslands Congress, Penn State College, State College, Pa., August 17-23.

28th National Shade Tree Conference, Hotel Statler, Boston, Mass., August 18-22.

Connecticut Agricultural Expm. Sta. Field Day, Experimental Farm, Mt. Carmel, Conn., Aug. 20.

National Flying Farmers Convention, Alabama Polytechnic Institute, Auburn, Ala., Aug. 27-30.

National Agricultural Chemicals Assn., Essex & Sussex Hotel, Spring Lake, N. J., Sept. 3, 4, 5.

American Phytopathological Society, Cornell University, Ithaca, N. Y., September 9-12.

National Pest Control Association, Rice Hotel, Houston, Texas, October 20-22.

Meeting of Fertilizer Section of National Safety Congress, Chicago, Ill., October 22 & 23.

Sixth Annual Beltwide Cotton Mechanization Conference, Bakersfield, California, Oct. 22-24.

California Fertilizer Association, Desert Inn, Palm Springs, Calif., Nov. 10-12.

National Fertilizer Association Fall Meeting, Roney Plaza Hotel, Miami, Fla., November 19-21.

Joint meeting, North Central Weed Control Conference and Western Canadian Weed Conference, Royal Alexandra Hotel, Winnipeg, Canada, December 8, 1952.

TALE ENDS

THE ultimate in the city-version of "farming" has apparently been reached! A large ad in a New York newspaper startles its readers with a headline: "How to Grow Thousands of Flowers Without Dirtying Your Hands." The gimmick is, that by using liquid fertilizer, via a sprinkling can, one can "grow masses of beautiful roses, marigolds, phlox, zinnias and chrysanthemums in your garden this summer with nothing more than a sprinkling of this miraculous plant food twice a month,—and virtually no other care!" The ad continues "by using some of the fertilizer you can easily pick up to 200 pounds of giant 10-inch cucumbers, big, meat packed 1 pound tomatoes, massive heads of lettuce, cabbages, luscious corn, sweet peas and strawberries from a tiny patch in your back yard no bigger than a one-car garage.

We can't help smiling at how the average "dirt farmer" would react to such an idea. It would be a pretty difficult job to feed the world's increasing population without getting a trifle soiled in the process.

• • •

Modern version of "carrying coals to Newcastle" was noted this spring when McLaughlin Gormley King Co., Minneapolis, shipped 130 pounds of technical allethrin to Kobe, Japan, via plane. The so-called "synthetic pyrethrum" is now competing with the natural product in the land which produced 90% of all pyrethrum flowers, prior to World War II. In the photo, C. I. Rovick, an MGK official, supervises the loading of the allethrin shipment on board a Northwest Airlines plane.

•

Adding considerable humor to the technical discourse at NFA's panel, was a traffic-light arrangement whereby speakers kept track of their time. A green light meant "keep talking," a yellow light; "time's almost up"; and a red light, "time to quit." Whenever a speaker ran through a red light, he was quickly "shot" by a pistol which instead of sending a bullet toward the mark, ejected a little flag with the word "BANG!" on it. . . . but it worked!

On the Run?

HAS competition got you on the run? Business giving you a bad time? Good advertising in the right place can help turn the tide and pep up sales. And, if it be in the field of chemicals for agriculture where you want to pep up business, we suggest specifically advertising in

AGRICULTURAL CHEMICALS

175 FIFTH AVE. NEW YORK 10, N. Y.

NO. 2 OF A SERIES

ON HOW TO

Stretch a MULTIWALL Paper Bag

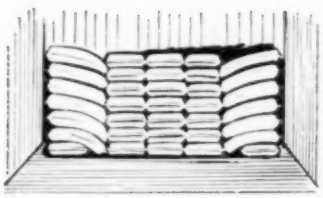
It is just good business to get the best possible use from your multiwalls. Here is one way to do it . . .

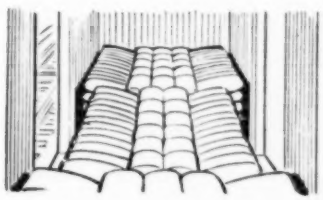
PROPER CAR LOADING

PREPARATION IS IMPORTANT

Cars should be clean, dry, and free from protruding nails or other projections. Remove all dirt, dust, rocks and grit from floor and walls. Remove loose nails and cover loose bolts with cardboard or several thicknesses of car liner. (Picture shows how to use straight-edge board to locate protruding nails, etc.)

Cover floor with good grade of car liner and put at least three thicknesses on door edges. Line walls, too, if they are in bad condition. Use asphalt-laminated paper to seal door cracks against dirt, rain, snow and cinders.





FOLLOW THESE LOADING RULES:

1. The car should be loaded so that the filled bags will not come in contact with side doors.

   a. Use a good grade of dunnage in the doorway or steel strapping covered with corrugated board.

   b. Follow proper loading patterns. (See illustrations.)

   c. Use retaining strips of special Scotch tape applied across the load, or steel retaining straps covered by one thickness of corrugated board.

2. Bags should be loaded tightly, solidly and flat, to minimize shifting in transit.

3. Balance the load so there will not be more weight on one end or side than on the other end or side.

   There are, in general, three different methods of loading—crosswise, brickwall and lengthwise. The crosswise method is generally considered to be the most acceptable.

   Loading in car doorways should be done in such a manner that this part of the load acts as a keystone between the loads in the ends of the car. (See illustration.)

Want the Whole Story?

Ask your Bemis Man for free, illustrated copy of Bemis Multiwall Packaging Guide. It deals with Storage, Filling and Closing, Handling, Palletizing and other important subjects.

• • •

If you need cotton or burlap bags also, Bemis is your best source.

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